

FEBRUARY, 1959

# AMATEUR RADIO

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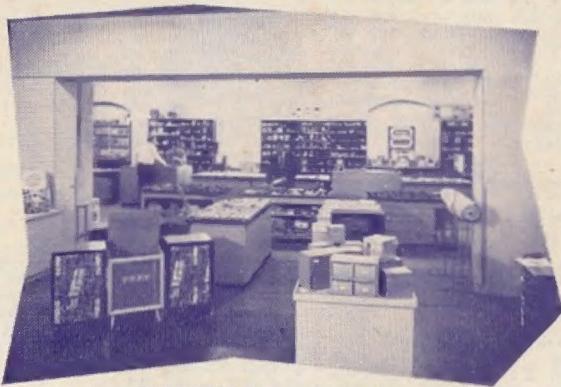
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**TECHNICAL EDITOR:**

K. E. PINCOTT, VK3AFJ.

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# AMATEUR RADIO

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## EDITORIAL



## HOBBY???

IT is often advisable from time to time, no matter what walk of life we tread, to re-orient our thoughts in regard to our personal activities. In the matter of earning our livelihood we might give consideration to the future; concerning our leisure time, how we spend it.

The Radio Amateur, according to his code, is said to possess a hobby—a leisure time activity. However, when one consults with the Shorter Oxford Dictionary difficulty is experienced in making Amateur activities and portion of the definition coincide. The volume concerned considers that a hobby is "a favourite occupation or topic pursued for amusement" or in further delimitation "an individual pursuit to which a person is unduly devoted".

Can we then say that our spare-time efforts are just "an individual pursuit"? Our financial outlay, our broad study, our thoughtful construction merely adds up to "a favourite occupation". What of the benefits the scientific and industrial organisations gain and will gain from our thoughtful observations? Just "a favourite occupation"?

To the general public perhaps, without an appreciation of what goes into Amateur Radio, the word hobby will suffice; but to those who

know and understand, it is extremely doubtful if this word can even touch on the multitudinous ramifications of our operations.

As members of this great worldwide fraternity, we should make it our business to let the public in general know that Radio Amateurs are people who carry out modest forms of radio research in that most searching field of all—"practical test"—that Radio Amateurs are 24-hour-a-day ambassadors spreading good-will to every corner of the globe. That Radio Amateurs are citizens who place their personal possessions—their radio equipment—at the disposal of the public as a whole when the necessity arises.

Maybe we are worthy of the word Amateur—"one who cultivates anything as a pastime"; but surely we can say our pursuits deserve better than hobby. Ours is more, much more than "a favourite occupation". It is an act of citizenship, of study, of research. We are operating in a field of especial significance. In keeping with this then let us be more than just a hobbyist. Let us be proud of the fact that we are engaged in Amateur experimentation as well as other activities, and that we can truthfully be described as Amateur Experimenters.

FEDERAL EXECUTIVE

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# Two Mullard

## Tubes



**2½" general purpose tube  
DG7-5 (CV2175)**

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# YOUR VISION AND TELEVISION

WILLIAM E. OWENS,\* F.V.O.A.

IT is necessary in this short article for me to explain at once that this subject matter could be elaborated to a far greater extent than I propose. However, as it is necessary to condense a considerable amount of information within a small compass and in as simple a form as possible, I trust the more technically minded reader will overlook the approximations and over-simplifications of some of the explanations.

My objects are—

- (a) To attempt to help you in some of the optical and visual problems you will encounter in your work with television, and explain the reactions to television of the viewer;
- (b) To attempt to outline the visual background and application of television.

Now, a television set is primarily a box of electronics, and is truly a wonderful instrument, with all of its own technical problems. However, when the picture tube heats up and the image appears, it becomes at once also an optical and visual phenomena, and you enter an entirely different field of science.

The proof of what I have said is simple. Just close your eyes in front of your television set and instantly it becomes no more than a radio.



Fig. 1.—Like a Camera.

Our problem is divided into three parts:

- (a) Light,
- (b) Optical,
- (c) Visual.

A full analysis shows that the following are the specific problems:

- (1) The problem of the quality of the light emitted from the tube.
- (2) The quality of the image formed on the picture tube.
- (3) The relationship of movement of the images to the screen.
- (4) The problems of refractive errors in the human eye.
- (5) Flicker, viewing distance, viewing periods, and fatigue.

Generally speaking, the picture tube has a peak emission of light at 440 millimicrons (Indigo), and again at 565 millimicrons (yellow-green). Now, yellow-green light agrees quite well with the maximum sensitivity of the human eye, and is useful light, but the Indigo section (which represents 27% of the total light of the screen) has little visual

use, and only affects the light adaptation of the eye. Hence the severe dazzle when the set is turned up too brightly, or when the screen is too bright in relation to the surrounding light in the room.

The image on the screen is an **electronic image**, not an **optical one**. For some hundreds of years scientists have been perfecting optical images, hence the high perfection of the optical instruments with which you are all familiar, that is, telescopes, field glasses, spectacles, etc. But the image on the picture tube is one that is formed by the impact of a stream of electrons on a fluorescing surface and is not a complete picture at any time, but a series of lines constantly appearing light and dark, according to the transmission. Indeed, the image is, in effect, **not really there at all**, but is only seen because of a phenomena of human vision called **retinal retentivity**. Because the eye retains the image it sees for a brief period (as is the case when you look at a bright light and look away), this factor permits you to see the picture as a continuous one. Remember also, a good deal of definition is lost when viewing movies shown on television because each process of photography and re-transmission causes some loss in definition.

One of the new skills that is required when viewing television is that of the appreciation of movement with the eyes kept quite still.

It is normal for the eyes to follow movement at a subconscious level, and this can be seen when you watch the flight of a tennis ball after it leaves the racket. The eyes are fitted with quick-acting muscles to enable this to be done, not only with one eye, but with both eyes locked together in high precision.

The reverse occurs when viewing a television screen, when the eyes must be kept almost motionless whilst the action of the flight of the ball, for instance, is covered by the television

camera. In the beginning, this reverse viewing of movement must be learned by the viewer, and can often cause symptoms of vertigo, etc., until it has been mastered.

The human eye is very similar in its optical system to that of a camera, and for those people who know photography, it can be said to work at approximately a N.A. of F 4.5. Like a camera, the eye has a lens behind the pupil, and is normally focused for infinity, and objects from 20 ft. onwards require no additional focusing of the eye. However, the eye, like the camera (Fig. 1), has to have its focus altered for distances closer than 20 ft., and whereas this is accomplished in the camera by altering the lens position, the human eye alters its lens shape by means of an internal muscle and sus-

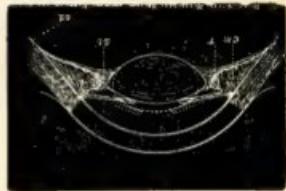


Fig. 2a.—Accommodation.

pensory fibres. The presence of a blurred image on the retina or light-sensitive area of the human eye will stimulate this focusing, causing the lens to be made more convex and adjust the eye to focus objects at the required distance. This is done with a fair degree of precision. Many of you are aware that a good quality camera needs a miniature range finder built into it to obtain the high degree of precision in its focus.

The optical defects of the human eye may be considered, for the purpose of this article, to be anatomical or axial; that is, the eye-ball is too short for its focus—commonly called Long Sight (Fig. 2). The eye-ball may be too long—called Myopia or Short Sight (Fig. 3); or the front of the eye, called the Cornea, may not be spherical—thus causing double focus or Astigmatism (Fig. 4).

These defects affect either the clarity of the images seen by the patient or the degree of effort (eyestrain) required to achieve clear vision.

The long-sighted person usually sees clearly at all unless objects are close. They, too, tend to screw up their eyelids and are noticeably slow in identifying distant objects.

The short-sighted person just doesn't see clearly at all unless objects are close. They, too, tend to screw up their eyelids and are noticeably slow in identifying distant objects.

Those with Astigmatism usually suffer most and combine many of the symptoms of the other two defects.



Fig. 2.—Hyperopia (farsightedness).

\* Director of Andrew Goddes Pty. Ltd., Optometrists and Spectacle Makers, 137 Elizabeth St., Melbourne, C.1, Vic.

It should be obvious, therefore, that if the viewer has a television set which is accurately focused and with proper background lighting, and sitting at a reasonable distance, yet, in spite of this, has sore eyes, headaches or blurred or double vision, then the problem is due to optical errors in the human eye, and they should seek professional advice at once.

Television does not in itself cause eyestrain when properly used and viewed, but does seek out unerringly those persons whose vision, for one of several reasons indicated, is not normal.

I have referred to the words **retinal retentivity** whereby the eye retains its image. Now, a light must flash on and off between 16 to 30 flashes per second (varying with the individual) for this flashing light to be seen continuously. Movies operate at about 48 flashes per second; but in television, the picture is changing all over the screen all of the time, and any given point on the screen rises and falls in brightness about thirty times per second. If you look away from the television screen, it is possible to see this flickering of the image out of the corner of the eye. So it is quite normal for this phenomena to be observed in this manner should it be reported to you by viewers. However, if the tube illumination is too intense, then the flicker phenomena increases due to the nerve relays in the retina.

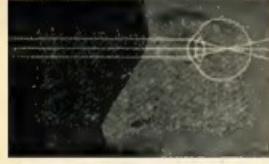


Fig. 3.—Myopia (nearsightedness).

#### SOME HINTS IN T.V. VIEWING

The viewing distance of a television set should be roughly six to seven times the height of the screen, and viewing it at too great a distance may make certain portions of the picture too small for visual appreciation, and viewing it too closely calls for excess focus of the eye plus muscular convergence of the two eyes, and will cause fatigue.

One thing that must be clearly in the minds of all viewers is the duration of the viewing periods, and it is amazing just how much time does elapse when one sits down comfortably in front of this electronic visual wonder for a night's enjoyment. Two, three or four hours continuous viewing occur almost without the viewer being conscious of the passage of time, and so one must expect that visual fatigue can follow **too much viewing for too long a period**, just the same as over exertion in any field of function will give the same results.

Children should be rationed in a commonsense manner in their viewing periods, and although at first the fascination of these little figures so lifelike, and so interesting, may cause them to sit abnormally close, to the

extent that the cover glass is usually covered with tiny finger prints, yet, when that novelty has worn off, they should be seated at a specific distance along with the adults.

The lighting in the room should be not as bright as the screen, and yet not so dull that the screen glares out of a dull contrast. Remember that the light is being transmitted **through the tube** to you, and not reflected from a screen as in the case of movies, which is the fundamental reason why movies are seen better in a completely darkened room, and television is not.



Fig. 4.—Astigmatism.

There is a wide variation in the degree of contrast between the room illumination and the picture tube, and commonsense is a great help in treating this problem. Usually floor lamps, such as your standard lamp, or one or other of the specially built television lamps will be a great help, and they should be so arranged that they are out of the way of your own line of vision, do not reflect in the cover glass of the television screen, and yet illuminate softly the wall immediately behind the television set.

Always allow a short period for the eyes to become dark adapted, after watching a television screen for a long period, before you get in your car to drive home on a dark night.

Do not resist unwisely the wearing of glasses when they are ordered for you, or other advice given by your professional advisers.

Keep your set illumination to a minimum, and make sure that the installation of the set is correct so as to give you the best possible picture image.

The immense number of television sets already sold in Melbourne and Sydney, and the enormous number of licences being issued each week, are an indication as to how this new medium will alter our lives and our eye habits.

The writer, who saw television in England and America in 1948 and again in 1955, was staggered at the tremendous increase that was apparent in the number of televiewers, both in the old world and in the new.

Already in Melbourne and Sydney, television dealers have had brought to their notice in no uncertain manner the visual problems of this new media, and in Chicago it was the writer's privilege to take special lectures that had been prepared, so as to be ready for the problems to be met with in this new field.

Here in Australia, we are seeing a good form of television, equal fully to that viewed abroad, but yet we are only touching the fringes of the appli-

cation of television in one form or the other as it will come to pass in a very few years.

Already, closed circuit television is a wonderful field in education, in surgical demonstrations and many other fields. It is used extensively by banks, by engineering projects, in underwater photography, and now the eye professors are making use of television to train children with retarded vision or poor eye co-ordination.

In conclusion, I may say that your eye men are quite as deeply involved in the visual aspects of television as you are in the electronics, and it is necessary for both to know some of each other's problems in their respective fields, and I hope that this short discussion on vision may be of some help to you all.

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# Series Phased Array, Mark?

COLIN A. MACKENZIE,\* VK3ACM

In its original form (Fig. 1) this antenna was known as a Marconi-Franklin Series Phased Aerial. As its name implies, it was a product of the Marconi Company and was first fully described in 1933. It is an end-on or end-fire array, having uni-directional characteristics.

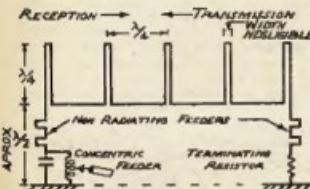


FIG. 1  
MARCONI FRANKLIN SERIES PHASED  
AERIAL.

The next development was described briefly in "QST," Dec. 1945, p. 62-63, "The World Above 50 Mc" by E. P. Tilton, W1HDG. The information was given to A.R.R.L. Headquarters by an anonymous foreign Amateur. This development consisted of adding the lower half or image, as shown in Fig. 2.

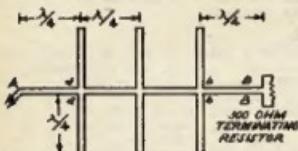


FIG. 2

IT IS POINTED OUT IN QST THAT  $\frac{1}{4}$  SECTION B MAY BE ELIMINATED. AND IF FEED LINE TO TRANSMITTER IS 300 OHM, SECTION A & B MAY ALSO BE DISPENSED WITH

Exactly the same arrangement was later described in "Amateur Radio," May 1948, p. 3, "Series Phased Aerial Arrays" by H. K. Love, VK3KU.

The next we hear of this type of aerial is again in "Amateur Radio," Jan. 1950, p. 14, "The Lenfo Series."

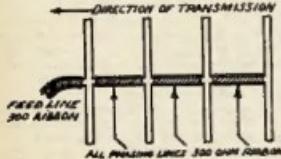


FIG. 3  
THE LENFO  
HERE THE 300 OHM TERMINATING  
RESISTOR HAS BEEN REPLACED BY  
A FEEDED DIPOLE

"Phased Array" by Len Jackson and C. Gibson, VK3FO (Fig. 3).

It is in this form that, I think, there would be most interest. It should give high gain, good back-to-front ratio, wide bandwidth, be easy to feed, and require no critical adjustments.

However, from various sources disappointing results have been reported, even after following carefully the design procedure recommended. Now unfortunately the writer, not being in a position, because of lack of equipment, to carry out the necessary measurements, has, after much thought and waste paper, decided the easiest way is to throw the problem to the wolves, so to speak, in the hope that some mathematical genius in conjunction with some experimental wizards, will take up the challenge and thrash the problem to bits and come up with all the answers.

Here are the problems:

- (1) What is the correct value of propagation constant "K" to use in the design of the elements?
- (2) What effect does the spacing of the conductors in the loops have on their resonant length?
- (3) What effect on the performance does the use of 300 ohm twin ribbon quarterwave sections have?

## MARCONI-FRANKLIN

To understand the problem more clearly we must first take a look at the basic theory of the Marconi-Franklin series phased aerial shown diagrammatically in Fig. 4 (a).

In the example five loops are used. This number can be increased or decreased, depending on the gain and beam width required, or, of course, for Amateur use, the space available to erect the beast.

Considering its action as a transmitter, travelling waves are fed via a non-radiating feeder to the point A from whence they travel along the aerial to point O. Then by another non-radiating feeder to the terminating resistor which has a value equal to the impedance of the system. This resistor absorbs any residual energy not radiated. It has been found that this resistor can be dispensed with when the length of the aerial amounts to about four wavelengths. Under these conditions the travelling wave energy is wholly dissipated.

The dotted curves in Fig. 4 (a) represent a travelling current wave at an instant of time, assuming no attenuation losses. This travelling wave is also represented in Fig. 4 (b).

The two conductors comprising each loop are made close enough in space, so that, as regards radiation, they may be considered as coincident, and

therefore replaceable by a single wire on which there are two waves of equal amplitude travelling in opposite directions. Stationary or standing waves will therefore be set up. ("Lenfo" please take note. If there were no standing waves how would it work?) The nodes of which are situated at the points B, E, H, K and N, since at these points there will always be two equal currents flowing in opposite directions. Each loop will therefore radiate in the same way as a single quarter wavelength aerial carrying a stationary wave.

The direction of the arrows in Fig. 4 (a) and (b) show that the loops in the aerial array are not radiating in the same phase at the same instant of time.

Fig. 4 (c) and (d) show the relative phase of each of the loops, the vectors of Fig. 4 (c) indicating a progressive phase difference of 90° between successive loops. At the instant of maximum radiation, i.e. that chosen for the diagram, it will be seen that only each alternate loop DEF and JKL is radiating; the current in DEF leads that in ABC by 90°, and so on down the array.

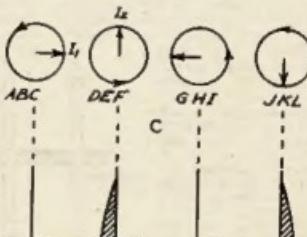
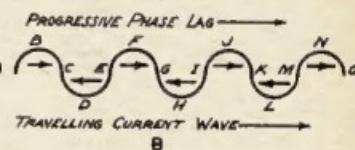
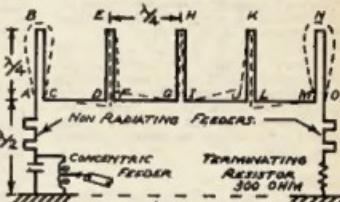


FIG. 4

\* Ballindella, via Rochester, Vic.

from the end A. (It should be noted that a lag of  $270^\circ$  is electrically equivalent to a lead of  $90^\circ$ .)

Although each loop is equivalent to a quarter wave aerial, there is one important difference, it can be shown that the effective radiation current is doubled, thereby increasing the radiating resistance four times. As the loops of the array are spaced a quarter wavelength apart and have equal currents in each, but with a phase difference of  $90^\circ$  between adjacent loops, the phase lagging progressively from A to M, we have the required conditions for an end-on or end-fire array, with reinforcement taking place in the direction from M to A.

Considering vector I. It represents a loop radiating a wave  $90^\circ$  ahead of I; since it is spaced by a quarter wavelength from the loop represented by I, its effect at that point will be equivalent to a wave arriving in phase. This reinforcement in the forward direction between the loops corresponding to vectors I<sub>1</sub> and I<sub>2</sub> is represented by rotating the latter backwards through  $90^\circ$ .

In the opposite direction, i.e. from A to M, since the radiation from the equivalent loop ABC starts with a lag of  $90^\circ$ , it will be lagging by another  $90^\circ$  and will therefore arrive exactly in anti-phase and so the two will cancel. From this it can be seen that the radiation from successive loops cancel in the backward direction. Therefore to obtain maximum back-to-front ratio an even number of loops should be used in the array—2, 4, 6, 5, etc.

The foregoing is a brief outline of the theory of the Marconi-Franklin series phased aerial. A more detailed and mathematical analysis can be obtained by consulting "Short Wave Wireless Communication," Ladner and Stoner (John Wiley & Sons), second edition, 1934.

#### "LENFO"

Now let us take a look at the "Lenfo." One of the main contributing factors to the failure of this antenna, especially where a long array is concerned, is the recommended use of twin 300 ohm ribbon for the quarter wave phasing sections. As the value of propagation factor K for this type of line is about 0.8; this means that electrically the phase difference between the loops is  $90^\circ$ , whilst the space phase difference is only  $72^\circ$ . This means that the radiation from successive loops is not in the correct phase relationship for maximum gain. Also in the backward direction the phase relationship causes a reduction in back-to-front ratio.

Fig. 5 shows a "Lenfo" consisting of six elements A, B, C, D, E and F spaced electrically  $90^\circ$  apart, but with only  $72^\circ$  physical separation. It is clear that the radiation from loop F as it travels forward to toward loop A, firstly arrives  $18^\circ$  ahead of the radiation from loop E,  $36^\circ$  ahead of that from loop D,  $54^\circ$  ahead of loop C, and, by the time it reaches loop A, it is leading by  $90^\circ$ . If the number of loops in the array were increased to 11,

the radiation from the rear or terminating loop would arrive  $180^\circ$  out of phase with the radiation from the leading or fed loop and the two would cancel each other.

In the backward direction, instead of each successive pair of loops cancelling, we would have a considerable amount of rear radiation, hence a poor back-to-front ratio. It is therefore essential that the space and electrical phase difference between successive loops be the same, or as close as possible. It should also be noted here that maximum gain is obtained from end-fire arrays for spacings between successive elements of between a quarter and three-eighths wavelengths when those successive elements are  $90^\circ$  electrically apart. This becomes more important as the array length is increased (see Terman's "Radio Engineer's Handbook," p. 802, Fig. 36).

the close spacing, about  $\frac{1}{2}$ " centre to centre, has on the resonant length would have to be determined experimentally.

The folded dipole terminating element would be designed in the usual manner adopted for these elements.

Series phase arrays, either in their original or modified form, are suitable for both vertical or horizontal polarization.

The writer has a 4 element "Lenfo" modified as outlined, operating on Channel 2 and quite good results have been obtained at this location—100 miles, as the crow flies, from Mt. Dandenong. However, due to lack of equipment it is not known if optimum performance has been achieved.

The elements are constructed of  $1\frac{1}{2}$ " o.d. dural tubing and the quarter wave sections use 0.104" copper wire spaced

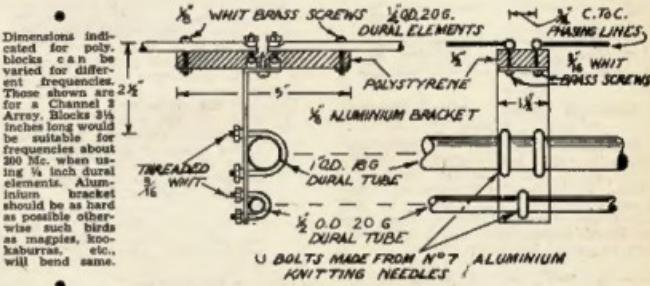


FIG. 6

An air spaced phasing line can easily be constructed using a minimum of insulating material that will have a propagation constant K of at least 0.98. Using such a line, the difference between successive loops will be less than  $2^\circ$  and could be neglected.

It is also important that in phased arrays the dimensions of the elements should be correct so that phase relations throughout the whole array are maintained. As the elements of this type of array can be supported at current loops, the end effect can be kept to a minimum.

In the "Lenfo" article a value for K of 0.9 for the design of the elements was suggested as being the correct figure to use. It is the writer's opinion that for the element design a value of K at least 0.95 should be used. The actual value will depend on the size of the conductors used. Just what effect

41/64" centre to centre. Aluminium wire of a suitable size and spacing for 300 ohms impedance would save a lot of weight. For any other size of conductor used in the 300 ohm quarter wave lines, correct centre to centre spacing can be obtained simply by multiplying the conductor diameter by 6.2. But for reasons that will be pointed out later, a conductor size that will give large spacing should be avoided, also close spacing of small diameter conductors will usually require more spacers and these of course will lower the value of K.

The usual method of mounting the elements of such an array is to use a wide wooden boom and support the elements on stand-off insulators. This is both heavy and has quite a large wind resistance. The array at this location uses twin dural tubes for the boom, arranged as shown in Fig. 8.

The use of twin tubes is to prevent sag. The same effect could be obtained by using bracing tubes at an angle between the boom and the mast. However, the array would be more difficult to handle before mounting.

The separation between the quarter wave line sections on the top of the boom is about  $2\frac{1}{2}$ ", and the lines are mounted symmetrically so that they are balanced to ground. The separation of  $2\frac{1}{2}$ " is ample as it represents about four times the centre to centre spacing of the line. It has been found that when the separation between a flat shield is equal to the centre to centre spacing of the line, the characteristic impedance is only lowered about 25 ohms, so in

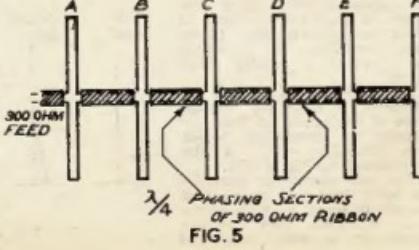


FIG. 5

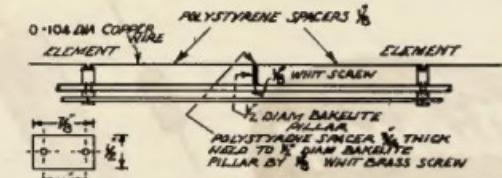
the above case any reduction could be neglected. The propagation constant  $K$  is not altered by the presence of the metallic boom, even when the spacing is equal to the centre to centre spacing; this is because as the distributed cap-

acitance is increased, the inductance is reduced due to eddy currents induced in the boom. As the propagation constant is determined by the product of inductance and capacity, and as this product remains constant, so the value of  $K$  is constant. (See "Principles of Radar" by M.I.T. Radar School, second edition, chapter vii, p. 7-9 and 7-10 [McGraw-Hill Book Company].)

When a wooden boom is used and the quarter wave sections are mounted close to it, both the propagation constant  $K$  and the impedance will be made lower because of the added capacity due to the dielectric constant of the wooden boom. Also the dielectric constant of the wooden boom will vary with the weather.

The quarter wave lines are supported as shown in Fig. 7.

FIG 7  
SUPPORT FOR PHASING LINES



#### APPENDIX

Formulae recommended by the writer:-

(1) For length round each half loop:

$$492 \times 0.95 \text{ feet}$$

Freq. Mc.

(2) For length of quarter wave phasing lines:

$$246 \times 0.98 \text{ feet}$$

Freq. Mc.

(3) For folded dipole. Length around complete loop:

$$984 \times 0.95 \text{ feet}$$

Freq. Mc.

Centre to centre spacing of conductors comprising the folded dipole about 3".

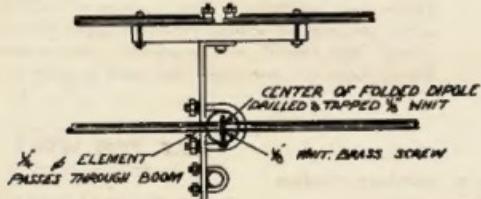


FIG 8

It will be noticed here that the plane of the conductors is vertical whereas in the other elements it is horizontal.

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## PREDICTION CHART, FEB. '59

Mr. E. AUSTRALIA — W. EUROPE S.R. Mc.

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E. AUSTRALIA — MEDITERRANEAN

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E. AUSTRALIA — N.W. U.S.A.

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E. AUSTRALIA — CENTRAL AMERICA

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E. AUSTRALIA — FAR EAST

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W. AUSTRALIA — W. EUROPE

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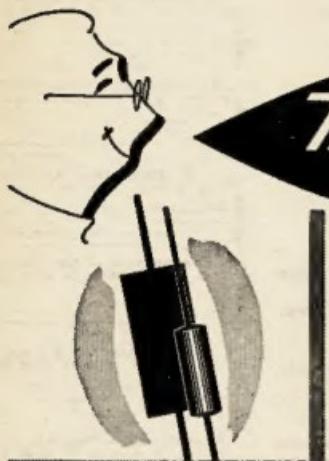
W. AUSTRALIA — S. AFRICA

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W. AUSTRALIA — FAR EAST

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# Adjustment Procedures for VHF Converters

## Hints on Attaining Optimum Performance with Simple Test Equipment

EUGENE C. FRYE, K6DJP

MANY newcomers to the Amateur v.h.f. field feel well able to build and wire their own converters. Most designs are simple enough, mechanically and electrically, but adjustment for peak performance is quite another matter. This article describes test procedures that can be carried through with only the simpler items of test equipment. The material presented is sufficiently general to be applicable to most v.h.f. converters described today.

Anyone who intends to build or even repair and adjust his own gear should have some test equipment. The items recommended here are not of the complex or expensive variety. They should be a part of the station equipment; as necessary as the transmitter, receiver or antenna system. First we need some form of test meter, either vacuum-tube voltmeter or volt-ohmmeter. The v.t.v.m. is preferable, as it is more versatile, but the latter will do if its meter is the sensitive 20,000 ohms-per-volt type. A grid-dip meter (g.d.o.) is a must for determining the resonant frequency of tuned circuits. A noise generator is a necessity for receiver work. The crystal-diode variety<sup>1</sup> is so simple and inexpensive that it is foolhardy to try to do without one. Let's see how these tools are used.

### LOCAL OSCILLATOR ADJUSTMENTS

If you have not already done so, it will facilitate converter adjustment procedure if you install a "looker point" in the grid circuit of the mixer stage. This can be a 1 megohm resistor connected between the mixer grid and a test jack or feed-through pin, as shown in Fig. 1. This point should be accessible from the top of the chassis. The d.c. voltage read here will be useful for setting the oscillator injection level and for alignment of the r.f. stages. Following initial alignment, subsequent checks can be made conveniently at this point without removing the converter bottom plate or other shielding.

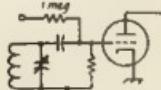


Fig. 1.—A test point for measuring injection bias is a great convenience in making converter adjustments. D.c. voltage may be read with vacuum-tube voltmeter or sensitive voltmeter.

Before proceeding with actual alignment it is a good idea to adjust all tuned circuits approximately to the desired resonant frequencies with the grid dip meter. This can be done with the converter inoperative, but with the heaters on.

The next step should be to get the oscillator working properly. If it is a tunable oscillator its frequency range should be checked and the dial calibrated roughly. If it is a crystal oscillator be sure that the frequency is right, and that it is controlled by the crystal. This can be done by listening to the oscillator note in a communications receiver. The frequency should vary only slightly, if at all, when the oscillator is tuned, or when a metallic object is placed near the tuned circuit. If the crystal frequency is out of range of the receiver this check will have to wait until the mixer is put into operation. Then a locally generated signal can be tuned in for the stability check. This signal could be from the transmitter exciter or other stable source. Some grid-dip oscillators are sufficiently stable for this purpose.

If the converter oscillator is not stable it is usually because of too much feedback. If no oscillation develops the feedback is too low, assuming, of course, that the crystal is in working condition. Most converter oscillators use overtone crystals or oscillator circuits that are intended to make the crystal work on one of its overtones. Overtone oscillator feedback adjustments have been discussed thoroughly in "QST".

If the converter has one or more multiplier stages following the crystal oscillator, these should now be checked to see that they are on the desired frequency. Use the g.d.o. as a wavemeter for this. The circuits may also be peaked for maximum output with the g.d.o. as an indicator, though the d.c. voltage at the mixer test point is the best indication, once it is determined that the stages are on the desired frequencies. Coupling from the oscillator is usually adjusted to give about minus 2 to 3 volts injection bias at the mixer grid, as measured with a v.t.v.m.

### R.F. AMPLIFIER RESPONSE

Once the injection level is set, the response of the r.f. stage or stages can be set up using the g.d.o. as a signal generator and the mixer test point as a signal detector. The g.d.o. can be connected to the antenna input terminal through a piece of transmission line about a half wavelength long. This can be co-ax or twin-lead, depending on the converter input circuit design. At the g.d.o. end of the line there should be a small pick-up loop, loaded with a half-watt carbon resistor of approximately the value of the line impedance. The loop can be made from the resistor leads, in fact.

Set the g.d.o. at approximately the middle of the desired converter operating range. Remove plate voltage from the converter oscillator and multiplier stages, so that only the voltage developed at the mixer grid by the amplified signal from the g.d.o. will be read.

Couple the loop to the g.d.o. coil and adjust its position so that minus 1 to 2 volts is read at the test point. Tune the r.f. circuits for the desired pass-band characteristics.

### R.F. OSCILLATION CHECKS

Before making final adjustments, check for oscillation in the r.f. stages. A simple test is to remove plate voltage from the oscillator and from the r.f. tube immediately preceding the mixer. Read the negative contact potential at the test point. Now apply the plate voltage to the r.f. stage again, but leave the oscillator disabled and the g.d.o. off. If the reading goes more negative when the r.f. stages are working, oscillation is present in the r.f. portion of the converter.

Elimination of r.f. oscillation can sometimes be quite a problem. If the r.f. amplifier is a cascade, it must first be determined which part of the amplifier is oscillating. A quick check on this is to read the amplifier plate current, and note if it changes as any circuit is tuned, or touched with a metallic object or the fingers. Usually oscillation in a cascade amplifier can be corrected by adjustment of the neutralizing coil, but there can be oscillation in the grounded-grid or second half of the stage. The latter is almost certainly due to improper grounding. Make ground connections separately, and never bypass to the center ring of the socket. Do not tie in ground connections from several points through a common wire to a single chassis point.

If the r.f. amplifier is a pentode, isolation of the grid and plate circuits may be important. This can be accomplished by a shield across the tube socket, but proper orientation of the coils may make this unnecessary. Mount the plate and grid coils as far as possible from each other, and in perpendicular planes to prevent inductive coupling between them. Observation of the d.c. voltage at the mixer test point (with oscillator off) will show whether corrective steps taken are in the right direction. Reduction and eventual elimination of voltage developed by r.f. oscillation is the condition to work for.

### ADJUSTING DOUBLE-TUNED CIRCUITS

R.f. bandpass adjustments may now be made. For this, be sure to set the signal level below the saturation point, as observed at the test point. Many current converter designs use double-tuned circuits, as they provide better attenuation of signals from outside the desired pass-band than single-tuned circuits. Unfortunately, they are notoriously difficult to align properly, unless a sweep generator and oscilloscope are available. The procedures outlined below will give satisfactory results without these expensive tools.

The simplest way of using an ordinary signal generator (or your g.d.o.) is

<sup>1</sup> Reprinted from "QST", October 1956.

<sup>2</sup> Tilton, "Noise Generators—Their Uses and Limitations", "QST", July 1953, p. 10.

# ★ The WARBURTON FRANKI Page

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the damping method. Set the signal generator or g.d.o. at the middle of the desired pass-band. Load one of the double-tuned circuits by connecting a carbon resistor of about 1000 ohms directly across it. The voltage read at the test point will drop considerably, and it may be necessary to increase the coupling to the signal source to provide a usable indication. Tune the other circuit for maximum indication at the test point. Remove the damping resistor and check the shape of the response curve by varying the signal generator across the converter tuning range and noting the voltage at the test point. It should resemble the curve of Fig. 2.

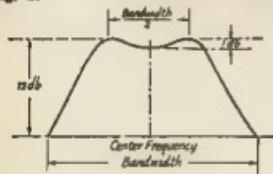


Fig. 2.—Typical response curve of a converter using double-tuned circuits. Essentially flat top and steep sides are desirable characteristics.

The chances are that the desired pass-band shape and bandwidth will not be realised with the first adjustment. In general, increasing the coupling while maintaining constant circuit Q will increase the bandwidth and also make the "horns" at the edges of the pass-band sharper. Increasing the loaded Q of one or both of the tuned circuits will increase the sharpness and height of the horns without materially affecting their frequencies. The loaded Q of the tuned circuits can be changed by varying the L/C ratio at the desired frequency. With constant loading, decreasing the capacitance and increasing the inductance will result in lower loaded Q, and vice-versa. Damping resistors can be used across the coils, if the minimum usable circuit capacitance results in too high a loaded Q (too narrow a passband).

Because changes in coupling or loading will often change the tuning of the circuits, it is a good idea to re-tune them after every adjustment of the coupling. It will also be found that coupling and Q adjustments are interacting. Should the passband shape tend to be tilted badly after adjustment by the damping method, it is an indication either that regeneration is present or that there is undesired coupling between the two tuned circuits. If the ratio of bandwidth to centre frequency is over 10 per cent, one of the stages will probably have to be detuned slightly to eliminate tilt in the slope of the passband.

An alternative procedure for aligning double-tuned circuits is to detune one circuit considerably, tune the second to maximum response, damp the second, and tune the first to maximum. Remove the damping resistor when this is completed.

After the r.f. circuits are aligned the local oscillator injection should be re-checked, as adjustment of the tuned circuits, particularly the one in the mixer grid, will usually change the amount of injection bias observed at the test point.

## LF. CIRCUITS

If necessary, the *if* circuits of the converter can be adjusted without connecting the converter to a communication receiver. To do this, terminate the converter output with a resistance equal to the impedance of the line used between the converter and the receiver. Connect the *r.f.* probe of the v.t.v.m. across this resistor. With the converter operating normally, use the g.d.o. as a signal generator in the manner outlined for *r.f.* bandpass adjustment. While slowly tuning the g.d.o. across the *r.f.* passband, adjust the *if* circuits to give the desired response.

In making these adjustments, be sure that the g.d.o. output does not saturate the converter. If the converter output is too low to give a usable indication by this method, or if a v.t.v.m. is not available, the converter will have to be connected to a receiver and the S meter used as an output indicator.

## NOISE FIGURE ADJUSTMENTS

It cannot be too strongly emphasised that the simplest, easiest and most accurate method of realising the ultimate sensitivity of a v.h.f. converter is the use of a noise generator. If you do not already have one of these handy devices, it will pay you to stop at this point and build one. Several excellent noise generator designs have appeared in "QST", and even the simplest—the crystal diode type—is a highly useful tool.<sup>1</sup>

An accessory to the noise generator is a good audio voltmeter. The a.c. scales of a v.t.v.m. can be used, but these are generally peak indicating devices, and because of the character of the receiver noise the needle will bounce in an annoying fashion. Ideally, a true square-law or r.m.s. detector is required. However, a satisfactory device for this service is an average type detector, with some smoothing. Such a detector, suitable for connection to a phone jack or across the speaker terminals, is shown in Fig. 3. The transformer used in the detector is not critical. The one used had a 400-ohm primary and a 2000-ohm secondary. Some of the small transistor audio transformers on the market work very well. Popular types of volt-ohmmeters have average-type rectifiers for use on their audio output scales. These are satisfactory for use as audio indicators in noise generator work.

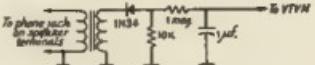


Fig. 3.—An audio detector arrangement for use in making noise-figure measurements.

In making noise generator tests it is important that the a.v.c. be disabled, and that both the audio and r.f. gain controls be set so that there is no tendency to saturate. Generally speaking, the audio gain should be run at a fairly high setting, and the r.f. gain should be turned up only to the point that will give a usable indication on the output indicator. The b.f.o. may be on or off, but all tests should be made with it in the position in which the work was started. The same may be said of the noise limiter. If you are

working in a completely quiet location the limiter should be left off, but more reliable results can be obtained in noisy locations if the limiter is used. A moderate amount of noise limiting will have no effect on the accuracy of noise generator measurements, provided that the setting of the limiter is not changed during the work.

With the noise generator connected, but turned off, set the audio and r.f. gain controls as described above to give any convenient reference reading on the output indicator. Now turn on the noise generator and adjust its output to give a 3 db. increase in the output indication. Unless you have a db. scale, this will require an increase of 1.414 times. Adjustments should now be made on the converter to see if the 3 db. increase in noise indication can be obtained at a lower setting of the noise generator. Any adjustment that works in this direction has improved (lowered) the receiver noise figure.

In converters having one or more *r.f.* stages, adjustment of the mixer should have no effect on the noise figure, except in the case of very large changes in settings. The gain and output may vary considerably as circuits are adjusted, or the injection level is changed, but the noise figure should remain the same. If small changes in mixer adjustment do affect the noise figure, it is proof that the *r.f.* portion of the converter is not working as it should.

Except in the case of the plate circuit of a first grounded-grid *r.f.* amplifier, adjustment of circuits other than the input circuit and the neutralisation of the first stage will have little or no effect on the noise figure. This holds so long as the gain of the first stage is sufficient to suppress noise contributions of succeeding stages. The neutralisation of the input circuit will have little effect on the over-all response of the converter, so the passband adjustments outlined earlier can be done first. They will require only minor touching up, if anything at all, when the noise figure has been adjusted to optimum. Do not be surprised if lowest noise figure is obtained at settings of the first circuits that result in somewhat less than maximum gain. This effect is to be expected in circuits using neutralised triodes, particularly. In these, the loading and tuning of the input circuit for best noise figure will not coincide with maximum gain setting of this circuit.

In some cases it may be noticed that the *r.f.* stages tend to oscillate when the converter input is not loaded properly. This is usually an indication of imperfect neutralisation of the first stage, but if the antenna circuit is properly matched to its transmission line, and the coupling to the input circuit is adjusted for best noise figure, oscillation with the antenna removed may not be harmful. If the antenna system has a high standing-wave ratio, however, more careful neutralisation may be necessary to achieve satisfactory performance and freedom from oscillation. If extensive work is to be done using a poorly matched antenna system, it may be advisable to adjust the converter input circuit for that antenna. This can only

(Continued on Page 11)

# FREEDOM OF THE AIR!

CONFESSOR OF A CONVERT

S. G. MERCER, G2DPY

This is, in its way, as important as any technical or DX writing article ever published in "Short Wave Magazine." All who take Amateur Radio seriously, or perhaps too seriously, should read it—and break their own shackles.—Editor

IT suddenly came to me that I did not at that moment know what to do with myself! Since 1948 this situation had never arisen and it warranted, I felt, some serious introspection. The time was 0900—on 21 Mc. I had heard some really good Pacific DX coming through, and on 14 Mc. the conditions were similar. I had, under my control, 100 watts of phone or c.w. efficiently channelled into a DX aerial system. The receiver was well proven. Absolutely nothing to stop me spending an hour or two with my hitherto all-absorbing DX'ing. But the inclination was just not there!

Ten years. What was there to show for it? I tried to catalogue my thoughts into sensible order. Yes—about 400 square feet of roof space packed with "unmissable bargains"; half-completed rigs; completed rigs that just never turned out as expected; pieces of gear that were of little use when originally acquired, and of still less use to anyone now in any conceivable event. In fact, about £50 worth—well, worth? No, a better description would be, "original cost" of sundry equipment that would (and might as well) lie up among the rafters for ever and a day.

My eyes and thoughts then turned to the unsightly stack of large cardboard boxes containing some fifteen thousand cards from all over the world. Surely these would arouse some enthusiasm—but no, they merely brought to mind laborious "catching up," frenzied posting and the artifices that went into obtaining some of the rare ones. Two hundred odd countries confirmed there cards for DXCC on four bands. Cards for W.A.Z., A.B.C., D.E.F., G.H.K., etc., etc.,—heck, what did it mean to me? Who looked at them? Over the past ten years not more than a dozen people had ever professed any real interest in them. My fellow-Amateurs were either secretly contemptuous or envious, according to their status, when they saw them. In fact, a huge heap of pretty postcards that had now become so out of hand that they were not even in any kind of order or system, being heaped any-old-how into those ugly cardboard boxes. No doubt the best thing would be to stow them away in the roof for some years until the children grew up, when they could re-discover them and remove the stamps.

Now—to look with new vision out of the window that has shed light on my operating table for so long. A rotary beam for ten metres sitting on a shaky pole; two equally shaky 40-foot masts; a mass of wires spewing across the back garden, so numerous that even now I had to stop and think what purpose each snarling tendon served.

\* Reprinted from "The Short Wave Magazine," August, 1956.

## REALISATION—

My eyes shut in inward reflection on other things. My three boys. "Dad, come and show me how to get this tyre on." "Hey, Dad, coming down for a swim?" "Dad, the circus is here today; Mummy says we can go if you will take us." Horror! To think of all the simple childlike requests that I had answered with a snorted "Shhrrup! I am listening to someone," or some similar abrupt refusal. I could not imagine how the children could even bother to speak to me now, after such treatment that had been handed out to them. The XYL. However could I have thought that bringing her in on a distant phone contact could compensate for the once-weekly visit to the cinema or theatre we used to have. When had I in recent years ever got the family together and said, "Away we go today for a real day out together?"

What had happened to my sense of values? I saw, for the first time in years, the river meandering its leisurely course outside my window, with all the wild life on it. The unruffled water shone with invitation. Things that had for a long time escaped my observation. Just then, Betty looked in at the door of the radio room; I noticed the desperate look of resignation on her face after confirming that I was in the usual position! I took in the dilapidated appearance of the paper, ceilings, paint—all neglected responsibilities. The children came in, not even bothering to look in to see me to say hello. What was the use when they would at most be rewarded with a grunt!

The savoury breakfast aroma from the kitchen stirred new life in me and—I had an appetite! I had not regarded meal-times for years as anything but a darned nuisance that interferred with my QSOs.

I had awakened to the realisation that a complete revision of my life was necessary. First, I would keep the rig on the air and use it only on such occasions when it was not going to interfere with any other person's activities. I would not get hot under the collar any more, whether or not there was some expedition belting through at S8, or even S2! I would use the rig in a friendly manner and cultivate some of those chaps that I had brushed off with "Won't hold u nw om—cul 73 VA." Betty would be taken out at least once a week, with no strings! All reasonable requests from the boys would be dealt with; I would see them to bed each night, with a fatherly word. I would take walks with the family, or by myself, and catch up with things that I had almost forgotten. I would reply to QSLs as a courtesy but otherwise would not send them out. I would be content with modest power and a less all-embracing and unsightly aerial system. In short, I would make my hobby into a hobby and not an all-enveloping, inconsiderate tyrant.

## —AND THE RESULT

These were my thoughts, and what might you ask, actually came out of it all? I will tell you.

I now have a medium-powered rig and a medium-sized aerial system. I go on the air during some weeks as much as twelve hours; other weeks not at all. In the summer my main activities are out of doors and time spent on the air is correspondingly reduced. I reply to cards received but do not send them unless requested. (There must be thousands who, though they may or may not admit it, kept going a QSL system similar to that which I maintained and which involved many people in extra work and expense absolutely unnecessarily.) When the gales lash around my garden I do not have to rush out trying to save over-ambitious masts. The house is tidier and cleaner. I have found that the children are really good lads who do appreciate having Dad around sometimes. My XYL appears as a new woman and is still wondering whatever suddenly happened! I enjoy my home, my hobby and life in general.

The moral is obvious: Do not let yourself become a slave to your hobby. This Amateur Radio is the grandest spare-time occupation that has ever been known. Keep it like that. Treat it with consideration and take it in doses that will not draw you too much out of ordinary everyday life, and it (and you) will be the more appreciated. It nearly made me into an "eccentric," to say the least.

I hope that these reflections will make some who read them think a little and realise that there is a big world outside Amateur Radio worthy of attention, and that there are people round you who are not interested in it. The watchword, as in most things, is—Moderation.

## ANY IDEAS WORTH £5?

Federal Executive is searching for a new design for the DXCC. Certificate and will pay £5 for a suitable idea.

It is not necessary to submit a draft copy, a pencil or ballpoint sketch on a sheet of note paper is all that is required.

Send as many entries as you like before the 15th March. Do not forget to put your name and address on the back of each sheet.

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All entries to be forwarded to the Federal Secretary, Box 2611W, G.P.O. Melbourne, C.I., Vic.

Be in it. Your idea might be worth £5!

# RADIOTRON

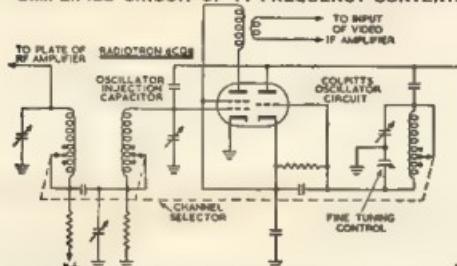
## TELEVISION VALVE SERIES

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The desirable requirements for TV frequency converters and if amplifiers can be summarised as follows:—

- transconductance should be high to provide as much gain as possible in the low-impedance, wide-band circuits used in a TV receiver.
- the equivalent noise resistance should be low for good signal to noise ratio in the frequency converter stage.
- there should be little feed-through from the oscillator to the rf stage to keep the oscillator radiation to a minimum.
- the oscillator section of the converter should have good frequency stability, and possess characteristics which make oscillation of the right amplitude easy to obtain
- the application of a variable control voltage to the grid should not have any appreciable effect on the input impedance to the valve when used as an if amplifier.

SIMPLIFIED CIRCUIT OF TV FREQUENCY CONVERTER



Theory predicts that the higher the transconductance ( $g_m$ ) and the sharper the cutoff characteristic in the mixer section of a converter, the higher will be the conversion transconductance ( $g_t$ ). The lower the bias required for plate current cutoff, the smaller the oscillator injection voltage that is required for maximum  $g_m$  and hence the lower is the oscillation radiation. Multigrid types of converters, i.e. those in which the signal and oscillator voltages are applied to separate grids, can be shown to be noisier and to have lower  $g_t$  at high frequencies than the types in which both voltages are applied to the one grid.

For the oscillator the most satisfactory operation is obtained by using a triode of high  $g_m$  and medium amplification factor ( $\mu$ ) in a circuit which will provide good frequency stability. The Colpitts type is often used for this purpose.

The series connection of the oscillator and mixer sections of the converter across the B+ supply offers the advantages of a reduction in current drain and more constant oscillator injection over the frequency range, due to the current-stabilising effect of this type of connection.

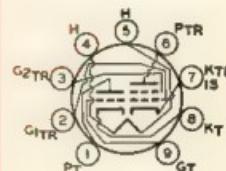
To maintain a desired relationship between transconductance and input impedance for valves used in the gain controlled stages of amplifiers an unbypassed cathode resistor is commonly used. The use in if amplifiers of valves with internally connected suppressors then presents difficulties in obtaining satisfactory stability. Valves featuring a tetrode construct are avoided for this complication.

The Radiotron 6CQ8, which has been especially designed to meet the requirements mentioned above, features a plate current characteristic with a sharp knee at relatively low plate voltages and linear operation with good linearity in the frequency converter stage in the TV receiver. The tetrode construction of the 6CQ8 avoids the difficulties in stability just mentioned, and together with the other characteristics of this valve, allows high performance to be obtained as a TV if amplifier. The tetrode section is also suitable for use as a sync separator and af amplifier. The triode is suitable for use as a sync separator and af amplifier, and as an af output stage where only moderate output is required. The triode may also be used as a cathode follower driven by the tetrode section in the video amplifier stage.



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AND HIS STATION**

**BILL HEHIR\***

**VK3RE**

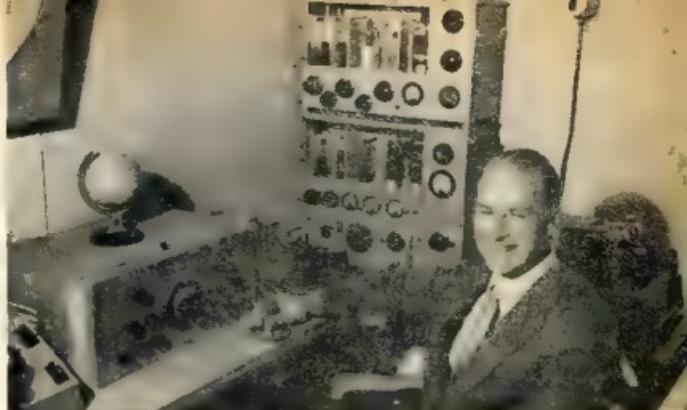
**Y**OU can tell Bill Hehir (VK3RE, Hamilton) is a Radio Ham a mile away—you cannot miss those towering beams atop his house which soar 105 feet!

And they're all his own work. "Just pushed them up," he'll tell you modestly "Built them in my lounge room"—and he did!

He built the lounge room, too. In fact Bill, a radio and t.v. engineer in Hamilton, built his whole house—32 squares in 12,000 hours.

And he was one Radio Ham who made sure he'd have his own radio room—he built his home AROUND his radio gear.

There wasn't a word of complaint from his wife, Sheila, either. "Bill was so keen on radio that there was only one thing for me to do—get interested in it myself!" And she has—in fact she spends a lot of her time speaking over the air to friends in America.



The 105 foot beam which towers over Bill's home consists of 3 element wide spaced beams on 20, 15 and 10, with a 40 metre dipole running along the 20 metre beam boom. As Hamilton is 200 air miles from Melbourne t.v. towers, Bill has erected above his Ham beams a 78 element antenna for Channels 7 and 9 and a 22 element for Channel 2.

For his Hi-Fi equipment the loud speaker console contains nine speakers —four for the lower tones, four for the middle register, and one tweeter.

Bill must be at least one of the hamiest hams that are.

From Neil Town (VK3ANK), who called on Bill passing through Hamilton recently

#### ADJUSTMENT PROCEDURES FOR V.H.F. CONVERTERS

*Continued from Page 111*

be done by listening to a signal, with the antenna connected, in the manner recently outlined by W6WVX.<sup>3</sup>

The importance of fairly high r.f. skirt selectivity in achieving accurate noise figure readings is not generally appreciated. If the converter passband includes portions of the image frequencies (which may easily happen when a low i.f. is used) the indicated noise figure will be lower than the true noise figure of the converter and actual receiver performance will be degraded.<sup>4</sup> Thus, particularly where double-tuned circuits are used, it is desirable to make at least preliminary adjustment of the converter passband, as already described, before attempting noise figure work.

As a final step, the r.f. and i.f. passband adjustments can be gone over, as minor changes will have no effect on the noise figure, so long as the first stage circuits are not altered. If the converter has an i.f. gain control it should be set so that the converter adds 10 to 20 db. of noise to the receiver output over that with the converter turned off.

The work on the converter will then be completed, and the experimenter can rest assured that he has made his hardware perform to the fullest extent of its capabilities. It is hoped that the measures detailed here will help many workers in the v.h.f. field to achieve better over-all receiving results, and more important, to develop a better feel for the adjustment of their equipment.

<sup>3</sup> Burson, "Notes on 144 Mc. Converter Design and Adjustment," "QST," July 1958, p. 44.  
<sup>4</sup> Weeks, "Image Ratio and Noise Figure" (Technical Correspondence), "QST," February 1956, p. 122.

#### 50 Mc. W.A.S.

Call	Loc.	Add.	Call	Loc.	Add.
VK3WI	12	4	VK3AEZ	10	1
VK3PG	5	3	VK3XA	11	1
VK3VW	9	3	VK3GM	18	1
VK3HR	2	1	VK3VCL	19	1
VK3HR	4	3	VK3ZB	18	1
VK3LC	1	1	VK3HO	17	1
VK3DW	2	1	VK3ABC	8	1
VK3HR	8	1	VK3WH	16	1
VK3HT	9	1			

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- DX Countries, Prefixes and their Zones.

Bill got his licence in 1934 and has lived in Hamilton for the past 10 years. Before that he flew more than 4,000 hours with Ansett Airways.

Bill even went to the trouble to build his own 21-tube double conversion fm./am. receiver. His transmitters (see picture) are a pair of 211s in push-pull for 80, 40 and 20, and a 813 for 10 and 15 metres. Both his transmitters are modulated by a pair of 25-year-old 2443Ns in class AB2. The maximum voltage Bill uses in the shack is 600 volts, with selenium rectifiers throughout.

\* Kent Road, Hamilton, Vic.

# Loran C.R.O. Indicator—Model AN/APN-4

J. J. KELLEHER,\* VK3ZAJ

A LARGE quantity of these instruments is available from disposals sources and when modified have many uses around the Ham shack. The following notes and the circuit have been extracted from "Loran, Long Range Navigation," by Pierce McKenzie and Woodward.

The notes have been abridged to give the details of the operation of the instrument as received, and it is hoped that these notes, along with the circuit diagram, will supply the essential details to establish a starting point from which conversion to some other type of instrument may be commenced.

This model has been produced in greater quantity and was more extensively used during World War II than any other Loran equipment.

The indicator consists of the crystal oscillator, dividers, delay and deflecting circuits for the 5 inch cathode ray tube.

## FUNCTIONAL DESCRIPTION

There are six dividers, the maximum dividing ratio is 5:1. The output pulse from the last divider is fed back to the second and third dividers to control the specific recurrence rate.

\* 3 Palme Street, Newport, W.II, Vic.

Pulses derived from the crystal oscillator and from the first, third and fourth dividers are mixed and applied to the vertical plate (along with the trace separation and pedestals) of the cathode ray tube as calibration markers at time intervals of 10, 50, 500 and 2,500  $\mu$ sec.

The complete schematic diagrams of the Indicator are shown on the opposite page.

## MANIPULATION

In making a time difference measurement, the operator must manipulate the r.f. channel, basic P.R.R. and selector switches, the gain, amplitude, balance and frequency controls, the left-right and sweep speed switches, the coarse and fine B—delay controls as well as the usual oscilloscope controls.

When the slow trace oscilloscope pattern is displayed the left-right moves the signals rapidly along the trace by momentarily changing the feed back. When one of the fast trace patterns is displayed the switch moves the signals slowly by changing the oscillator frequency.

The eight-position sweep speed switch is so designed that in making a time difference measurement the operator rotates the switch in numerical sequence from position 1 to 7.

The first four positions show the received signals and are used for positioning and matching the signals. On the first position the normal slow trace pattern is displayed.

The patterns of the second and third positions are fast traces of 750  $\mu$ sec. and 200  $\mu$ sec. respectively.

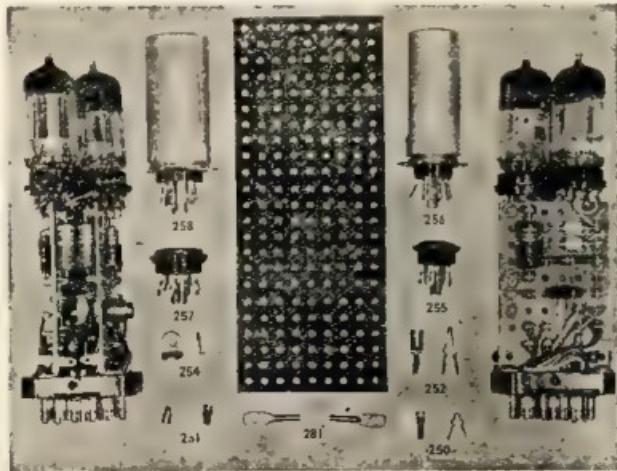
For the final matching of the pulses the separation of the 200  $\mu$ sec. traces is eliminated in position 4.

Positions 5, 6 and 7 are used for measuring the time difference between the received signals. For this purpose 10, 50, 500 and 2,500  $\mu$ sec. calibration markers are displayed on these three positions.

The pattern on position 5 is two 200  $\mu$ sec. traces with markers; on position 6 it is two 750  $\mu$ sec. traces with markers, and on position 7 it is two slow traces with pedestals and markers. On position 8, two 200  $\mu$ sec. traces with stair-step pattern of the third divider are presented for checking the feed back.

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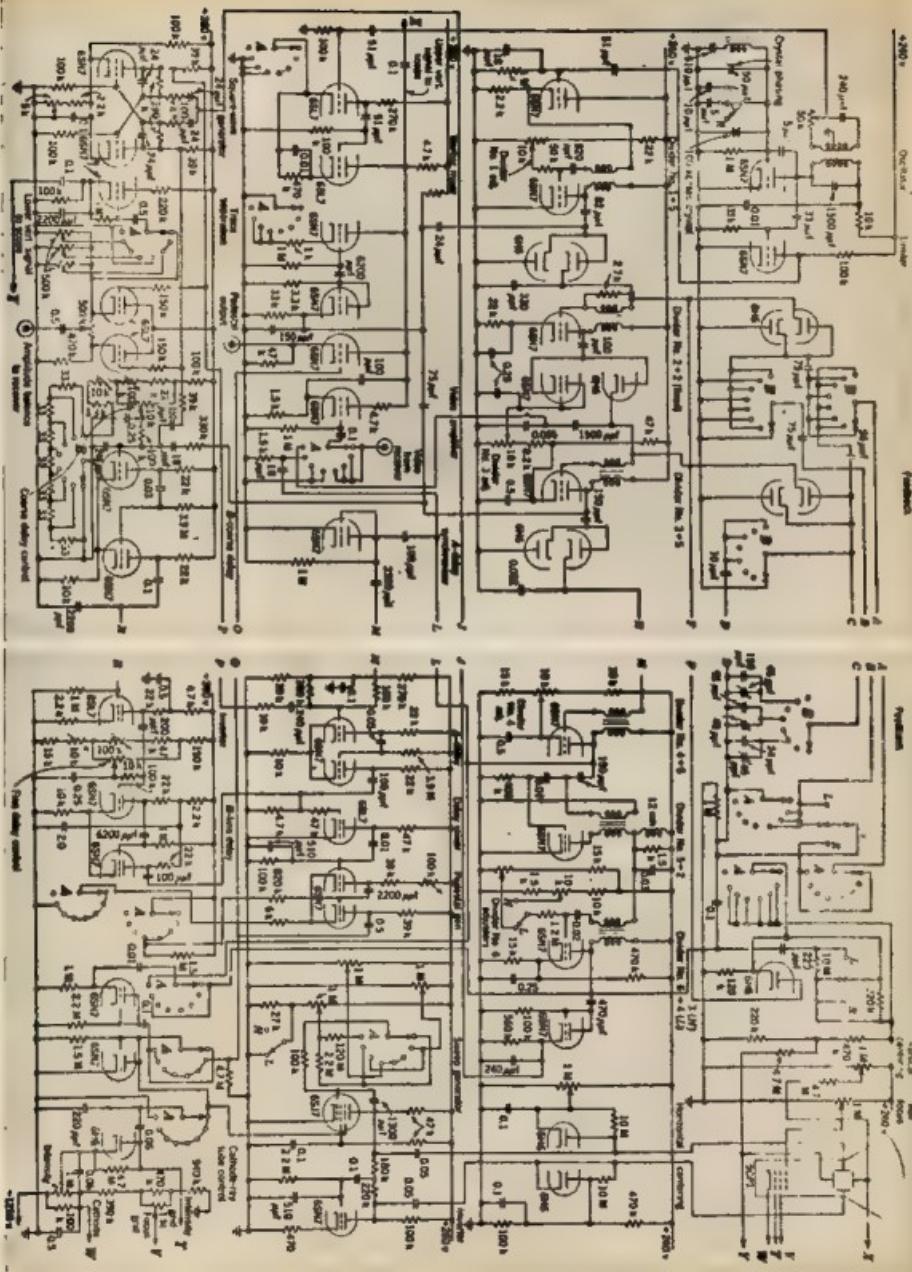
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Schematic diagram of Lorn C.R.O. Indicator—Model AN/APN-4.



## QTH'S YOU MAY NEED

LXJ17—Esch-Sur-Alzette, Luxembourg.  
DL7AH/LUX-QSL by D.A.R.C.  
7Z3E—Via W6GWN, Clifford Swann, Jr., 1817  
Woodbine Ave., Charleston, Virginia.  
EABCP—Aguilera y Perez y Perez, P.O. Box 515,  
Santa Cruz de Tenerife, Canary Island.  
CZ4LG—P.O. Box 1605, Valparaiso, Chile,  
South America.  
CZ4AC—Vicente Pascal T., CZH1L, Box 4000,  
Santiago, Chile, South America.  
CZ4AF—Sergio R. CEBAM, 1st Juan Fernan-  
dez Chil., South America.  
SVWVE—Henry B. Wood, Box 554, Athens,  
Greece.  
ZD7SP—George, Post Office, St. Helena Island.  
B5A—Baptist Missionary, Nr. 13, Kawa Str. Zaher,  
Cairo, Egypt.  
ZSMHP—7-Dem, Ubomber Ranches, Switzerland  
ISAAW—Post Box 53, Mogadiscio (4DO).  
ET2YB—Post Office, via ETIUS, A.P.O. 343,  
N.Y. (4DO).  
STEKO—QSL via R.S.G.B.

Ray Baty, VK3ANB, formerly VR3A, hopes to be operating on full power from his new QTH at St. Ives early in 1958.

## QSL DETAILS

ZAMB—CN8IF, LX8GH, QO8EM, URIBU,  
VP2YQ, VP2VO, V98M, XE1H, ZS6IX, 4X4CK,  
4X4PU, ZS6SL, QSL: CYTMIL, STAR, UDSRM,  
VP2GD, VP2YQ, ZD1FC, 3AOH, KJERR/VOR,  
VK3KJ, VK3L, VK3R, VK3T, VK3U, VK3V,  
H4CM, H4CM, ISAAW, ZK1IA.

In this first effort my thanks go to W4KVX for the use of his valuable DX Bulletin, 2QL for his long list of stations worked, and other valuable help. SAQOM, I appreciate your sincere wishes. George, and will be looking for you each month. ZAMB is also good to contact you over the air again and will be looking for you each month, 4DO, thanks for the list and New Year greetings, SHBY my dear friend, and with best regards that you are very soon. BERBIR has been the good ones, yes Eric you have certainly been an active s.w.l. for many years and your comments and notes will be much valued; WIA-L2001, you have worked hard ones in your last month, WIA-L2022, it was good to see you 485 worked on my trip through VK3-land; WIA-L2065, keep up the good work, Inn, and that tally of 45 countries will continue to grow.

## CORRESPONDENCE

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the publishers.

### "WHAT'S WRONG WITH ME?"

Editor "A.R." Dear Sir,  
Well I suppose that by now you have thought of a good answer, all of which, with a few appropriate adjectives, will end in "no DX", "no DX", "QRM", or "QRN".

No matter what we think, the fact remains that it is still DX season and a very shaky one too with all the commercials casting their envious eyes on it. It seems queer that with all this talk of fighting to retain our bands a few more people would do something practical by actually using them.

Having been a Ham since 1922 originally AJ2JC, I remember the old days when we had to battle the QRN on 80 and 40 if we really wanted to have any contacts and I suppose that is one of the reasons for my affectionate regard for these bands.

With the exception of a few years break at Woosers I have been on 40 continuously since 1946 and must admit that it has provided all the fun that I want.

Now for those boys who say the old band is dead. Let's see what a bit of battling with 35 watts can do. I am sure that the A.R. W.A.C. Net will admit this, this doesn't look so hot, but it took me 2,000 W contacts to finally land that North Dakota for the W.A.C.

Working six or seven Ws a night isn't everyone's idea of DX, but we ought to think that there are thousands of Hams on 40 who get up early in the morning and who consider VK as real DX. The number of contacts I saw attention to "1st VK contact" beats that out.

Don't get me wrong by thinking that all Ws on 40 are newcomers, you will get a shock when you hear the number of big "DX" men who come on when the higher frequencies go dead. As for poor signals, well I haven't heard one on 20 yet which will equal W6PGX who uses a 4 antenna beam and comes through like a local. W3EVN, W3EHW, W6UJ

and a host of others put in 80 to 90 signals around about 8 p.m. in summer.

For those who want 40 W.A.C. there is HC4HM on a few nights a week with his ST station, and QSL.

Admittedly the band has commercial QRN but by 1959 standards we should be able to work very close and it can be done. In the recent "CQ" Contest, 71 DX stations were worked on the Saturday night and 31 on the Sunday night and they included G5, VU, VR, KJ1, VE, KJ1A, W, JA, which isn't bad going for a poor band.

A sked is kept every Sunday and Monday evening with W4KVX, W4KJ, W4KJ, W4KJ, Adelaid, 1pm (2300 GMT) and it does the heart good to hear those boys coming through 80 on the "long path".

Some DX worked largely includes, in addition to the above, VU, 4AD, EC, EKA, TI and new ones keep on popping up, which makes that "80 DXCC" just a little closer.

From the foregoing remarks I hope to have proved that the old band still has a kick and we can't blame the QRN, but when there is no one there to answer him—I know, because morning after morning I am listening at 6 a.m. for those, at the present, elusive Europeans.

Well chaps, there's the story and let's try and give the old bands one more night's work before we begin the world's sleeping. I'll guarantee you will get a kick out of it.

—E. J. (Ted) Cawthron, VK3JME.

## TRAIL CHAMPION

Editor "A.R." Dear Sir,

It has been suggested to me that I would possibly help to clarify my remarks in Jan. "A.R." in reference to the 1958 VK-70 Contest.

Let me point out from the start that no reference has been made to our Federal Contest Committee, either direct or by implication, other than to state that the matter is "now in their hands".

When I first queried the rules, I wrote to the Sec. of the N.S.W. Div. asking his opinion on the matter, however if I remember correctly there were other matters in the letter and Norm has possibly overlooked it. Rather than waste time over this, I will simply not concern him. I wrote to the Sec. of the Federal Contest Committee, Mr. Reg Harris, VK5SRH, and as time was getting short, I addressed it to his home QTH. Apparently it got lost in the process, was recovered and written direct to this gentleman—the latter, no doubt, it have been a member for just over a year and

still have not got things set out properly as yet.) In any case, neither of these letters were answered or if so when was at that stage that the Contest was held. I did receive a reply from the N.S.W. Div. other than the last was sent just about 10 days prior to the Contest. I then wrote to the N.Z.A.R.T. and received the final letter, which as mentioned last month is now in the hands of the S.A. Group.

It appears that my letter last month has offended the F.C.C. I am very sorry about this and do hereby apologise for any statement which he contained in that letter which could cause any embarrassment to the F.C.C. or any other person, nor was it an attack on that body.

It was written to bring to light a misunderstanding which no doubt caused some confusion. The facts point to a clear infringement of the rules as stated in "A.R." permitted V.F. and ZLs to log each other, while a letter from the N.Z.A.R.T. states clearly they cannot. This is the issue in hand, and it cannot be brushed aside. I have written to the F.C.C. and asked them to take about it, I will hereby ask them to publish through these columns, the reason for this error. For there can be no doubt that somebody has slipped somewhere. A lot of fuss has been made nothing. What is myesy not? Depends how the individual views such matters. Any s.w.l. who goes to the trouble of entering a contest must take it seriously, and I would take this opportunity of pointing out that the F.C.C. has the right to ban any condition affected the transmitting section.

I have honestly attempted to explain my previous letter. I have apologised to the F.C.C. for the damage I may have done them, to the N.Z.A.R.T. and myself, in causing any embarrassment, and I am sorry if I have caused any. I only ask that an oversight of this nature does not occur again. I trust there are no more hurt feelings over the matter, and that the F.C.C. will not interfere with the workings of our association and will again point out that my letter was written mainly to have the matter cleared up for future contests, and to a lesser degree to inform the s.w.l.'s in general of the situation.

—Don Grantley, WIA-L2022.

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# VHF

Frank P. O'Dwyer, VK3OF  
180 Thomas Street,  
Hampshire, Vic.

Fair going for all Divisions with sporadic E throughout December and early Jan., coupled with a few off side effects. Bert DX contact went to VK5ZBT who QSOed JA during Dec. type of propagation not mentioned, probably FSK. His functioning can best be described as Albert 1PQ. Around Jan. 10 he listened to three W6 stations in a natter session, signals to fair strength, but conditions picked up before he could join in. That is the first reception of W signals in VK3 since Ian ZALZ heard WENDELL last May 1 at 1005 A.M.T.

The JA link appears to be re-establishing itself with ANG (RTW) working into there during the early part of Jan. The southern States are awaiting their turn now, high hopes held for good openings during Feb. When a good opening does occur the band is sure to be crowded. The situation has been ominous of late. Selectivity in the receiving line-up is possibly more important than sensitivity these days though naturally the latter is not to be discounted.

One VK3/VKS opening allowed the effective and sensible use of v.f.o.'s, the band being so cluttered with signals that many moved out of 144 Mc. into the higher bands. The first 400 Mc. being used and well covered by stations in both Divisions.

Now that the ZLs have shifted to 51 Mc. they should not be neglected, receivers should be adjusted to tune to 51.5 Mc. at least. But why stop there? Already the trend has set in to use the empty spaces up towards 50 Mc. and many have been trying to find the m.u.t. reaching that high, so many thought that it always cut off sharp at 50.5 Mc., in some cases about 50.1. Another pleasing aspect they find is that the efficiency of their beams does not drop as much as expected, unless of course they are already cut for work outside the low edge of the band.

The Christmas-New Year week resumed its normal habit of providing excellent extended openings after the great let-down of last year, with daily sporadic E openings spread over both Divisions and ZLs. The week after Christmas gave many good openings to other mainland Division from VK5 with FVG appearing as late as midnight. The VK6 gang gladdened many a Ham up and down the east coast by letting many numbers of them into the DX contest circuit.

The VKS-4 path has been very good while the ZLs have often been in to 8 plus to VK3-4-5 with the odd opening to VK6. One good opening on Jan. 10 was to VK5, the hearing end of the band, though VK5 and ZKX may have missed out on contacts because of the fierce QRM on their weaker signals. During this opening a couple of crafty VK6s snaked in VK5 contacts off the back of their beams which were on ZL. Not too much fun, but a swing of the beam brought up the signal strength.

Russ ZXK earns his contacts the hard way these days fighting fierce QRM. This explains why he is so hard to contact; a signal has to be good to ride in. Hence also the use of automatic SSB transmissions by Russ. The sparsely heard VK5 was not infrequently seen and have been commented upon by Bob ANG who has heard them fade in, hold steady, then depart again. Possibly others have had the same experience and wondered why Russ was not following his normal habit of call, then tune.

Very consistently during the last week of the old year and the first of the new, 4LX and others in central VK6 have been heard in VK3 to SS from midday on. But the VK5 gang find Verna hard not to crack, the band normally being open to him from VK3 and 5 at the same time, whereas VK6 is often crowded out. On Dec. 29 when an excellent opening to VK6 enabled them to join in the fun and make contacts. That after they had worked VK3 and 5 again on Jan. 1, Russ and others were clobbered out. The Meib. QRP boys were clobbered out on Jan. 4 when a quick opening to VK5 enabled them to join in the fun and make contacts. That after they had worked VK3 and 5 again on Jan. 5, Russ and others were clobbered out. Ian ZALZ snuffed a couple of quick VK5's on Jan. 4 when he heard a trop. opening on 144 Mc., made his contacts and then shot back to 50 Mc. ILZ and IBQ were at the other end. From the stations heard

calling him, ZALZ appeared to be doing well with his portable gear at Devonport, making the most of his holiday.

Rumour has it that Max 4HD has heard a European signal, but nothing is yet known here for certain. One JA, during a VK6 opening, was able to hear the noise which was heard in VK5 and conjecture as to their place of origin has ranged from ZS (bearing), refraction from VK6 to scatterback from VK3 and VK5. Run ZXK issued a strong plea for the more frequent use of c.w. because he cannot identify but which would be 10% per cent. copy on c.w.—3OF.

## VICTORIA

**6 Metres.**—December proved to be the best month for DX in VK5 since the reopening of the band. Every day was open during a period of nearly every day of the month and areas worked included VK3, 2, 4, 5, 6 and 2, ZL2, 3 and 4. Albert IPG heard a QSO between a number of Ws at noon but was not able to identify them as being from "California kilowatts". David ZLAT and Ian ZZBZ were operating portable during the Xmas period at country QTIs and report that considerably more DX can be heard at these locations than in the Melbourne area. Unfortunately very little information comes from 6 metre stations in the country and probably news of quite a few openings not heard in Melbourne passes unnoticed.

**1 Metre.**—For most of this month's 2 mx news the writer is indebted to Gordon ZELZ, who was good enough to send along a detailed account of the Warrnambool DX activity. Gordon and Brian ZZBZ have been conducting nightly sprints with Max ZCZC in Ouyen, up to date the path has proved quite reliable from Ballarat and contacts have been made 19 times. The best openings have been between 1.9 to 3.2 Mc. ZCZC has also recently worked into Colac and Melbourne and reports hearing ten runs by 4BT on 3 mx during the 6 mx breakthrough on Sunday, 35th Dec.

Other stations at present active in the West include ZCZC and ZCZD in Swan Hill, ZELZ at Bairnsdale, ZAGV at Colac and ZEPD at Horsham. Incidentally the Ballarat stations are all operating between 145.8 and 146.2 Mc. and are looking for 3 mx contacts most nights of the week.

Activists in the Melbourne area have been running low. Ian ZALZ has made a return to the band and has made a number of c.w. contacts with VK5 stations. The roll up for the Dec. 2 mx scramble did not approach that for the previous month. The winners with seven contacts each were Ivan ZDZ and John ZEAL.

**1 Metre.**—Ron ZJER has been operating portable from Mt. Bullenay using a QZQZB tripole and has run on 30.5 Mc. and should be able to make it to Moe, thus breaking the present VK3 1 mx record. Peter ZEDO is now running 30.5 Mc. and is planning to go to 30.8 in a QZQZB/30 triple. Peter has been heard by a number of local stations on 30.8 Mc. David ZLAT is sprucing up his 1 mx gear and has been running 30w. to a QZQZB/30 final on 30.5 Mc.

**1.5 Metres.**—Allan ZAEL was the speaker at the Dec. 1.v.h.f. meeting and gave a talk on his DX work in the past. Allan's interests include photography as well as radio, brought along over 150 colour transparencies of subjects ranging from the A.R.E.L. Headquarters in West Hartford to replicas of the three Spirit of St. Louis aircraft. His Ham Radio as well as a keen knowledge of things in other unrelated fields enabled Allan to give a very interesting two-hour talk. The Group were disappointed to hear that Allan's enthusiasm while giving his talk was so great that it had enabled him to buy an American car which was rewarded by the local authorities by refusing to grant an import licence and impounding the rx.

Little business was conducted at the meeting but a motion was passed instructing the Secretary to draft a note to the Cosmetic Committee expressing the Group's views regarding the sudden change in Rose Hill Contest Rules. —ZCAL

## SOUTH AUSTRALIA

Well the DX party is on, break throughs almost any day or night and some good scores coming up in the Rose Hill Contest.

Dec. 28 was a red-letter day for ZLAs. Up to 30 different ZLAs heard here and most of them worked by Col ZHJ and Bill ZSAK, also other VK districts at the same time.

Main DX worked locally was Russ ZKX on the 20th, 5 x 5 signals both ways, with Col

ZRO working him three times over a half hour period, understand that quite a few boys heard him, but were unable to make contact.

Locals heard amongst the DX and new to the band, David ZLZ, Ray ZBT, Ron ZCZ (who blew the dust out of his gear and just threw the switch) SME who has returned from Sydney to work for NSWIS, Bill SHD who has finished playing around with his one-eyed monocular, Max ZS2ZL, etc. In a long time Brian STRZI was seen DX working VK7 and running only 1w. and Ray ZBT, overtones to a QZQZB/12 to a dipole.

Some good openings to Hughie ZMC and SZAB on extended ground wave signals # 8 to 8 with very slow QSB. This is very good considering that they have to work ZMC and SZAB across the ranges.

Rollo SBO has automatic tuning in operation during his holidays. Takes approximately 2 mins. to tune the first meg. It has had dividends and is a pleasure for VK5. The VCO gives it a serious thought. TUI has been very useful in working Wally SWG again this season, he can be heard most evenings 5 to 8 off the back of the beam and I have made many contacts with him via VK5 in the middle working VK5.

Col SRO kindly made his QTH available for a preliminary v.h.f. meeting and arrangements were made for a proposal to be placed before the next W.I.A. (DX) meeting for the formation of a v.h.f. group within the DX section. The members involved are stations in VK5 operating at the present time on 50 Mc. and quite a few using 238 Mc. This, together with the listeners and others are sufficient in numbers to form a very active group. There has been a great interest to co-ordinate their activities for the benefit of one and all, emphasis being placed on the retention of our bands, organised listening for DX break throughs, the passing on of all information to interested and amateur organisations. Following the meeting were SMK, SMT, 87N, SKC, ZEBZ, SZBL, ZGQA, SZCH, SZBX, ZDZB and round table refreshments. Refreshments were taken at the conclusion of the meeting and thoroughly enjoyed.

Moves are afoot for a fox hunt in Feb. This will be the first organised to my knowledge in VK5. There are enough mobile tx's available for the fox, so I suggest that those interested get cracking on a 50 Mc. converter for their car rx's. Cheers ZA.

## WESTERN AUSTRALIA

The Christmas meeting of the W.A. V.H.F. Group was held at the home of SJS, taking the form of fox hunts, dips, rawchew, and barbeque. Unfortunately the fox experiments had to be abandoned due to a number of contraband "smiffers" going. Serves 'em right for running a SJS on the unprinted harmonic.

Plans are under way to construct and operate a 50 Mc beacon in VK5. This should be able to act in aiding our station to identify themselves. At present there are no plans. Indications are that 10 watts input will be run into stacked helices on 80.5 or thereabouts. Plans are still nebulous at this date as official sanction has still to be obtained. By the time this is printed hopefully we will have been finalised one way or the other.

6 metre DX has been fairly good this sporadic season with openings to all areas except VK5. A lone ZL created a real deal of excitement in the 30th, when Bert ZBT as also a lone VK7 on 30th. The 30th saw the best opening in VK5 for years with VK3, 5, 8, 7, and ZL contacted. Some very interesting diversity effects are being noted e.g. Bob EZB did not hear VK5 while VK3, 5, 8, 7, and ZL contacted. It was also noted that ZL heard no VK5 but Perth radio heard no ZLs but worked 12 or more VK5s. For the benefit of the VK5 boys, for the most consistent and/or strong sigs heard bear came from SZAK, SKK and ZEBZ. What is it boys? Locations, gear or antenna?

ZBT actually worked a JA during Dec., but was unable to wrest a number from the uncompromising JA, although HILKA was heard for two or three consecutive days, no other JA were heard.

144 Mc.—SBO and SWG are at it again working in early morning over the 340 mil path Perth-Albany. ZAAA (MacLimpup) is also active. While the opportunity presents itself the other sides have checked 2 with Polo running 50 Mc. DX openings, but without any luck so far.

ZBZ has been putting out strong signals into Perth with HEATZ, triplex, etc. Notes on the last week's work. Apart from ZGQA and SZUBZ's mighty mite, 3 mx activity is in the doldrums, owing to the 50 Mc. DX currently appearing. Several of the boys are designing or building 3 mx gear at present though—ZBZ.

# NOTES

## NEW SOUTH WALES

### HUNTER BRANCH

The last Branch meeting for 1963 was held at the University, Tighe Hall, on Dec. 12 when the Branch was represented by Bill 2ZL and Joe 2JR performing SCS, 2ZDU, 2RJ, 2AQH, 2ZDF, 2FH, 2AQR, 2ADS, 2XT, 2ANA, 2QH, 2ZL, 2AFA, 2ALA, 2RU, 2ZCA. Messrs. Southland, Bailey, Hall, Rugg, Roberts, Grey, Stobbs, and Mr. and Mrs. Lawler and Mr. Bell.

The writer was disappointed at the brief discourse by Joe as he fully expected Bob Winch's record to be broken, but apparently Joe was hungry and heard of the excellent supper that was to be served. Anyway, the following pieces of information included hints and kinks on the BC2M, how to pin-point piccolo pots; and excellent slides of the Brussels Exposition were well received.

Bill 2ZL was about to protest when Joe said that there was bound on the signal breakers and many English bushwalkers, but with all his Aldermanic guile he put up slides of traction engines and all was forgiven.

Was surprised by the absence of Gordon 2CI, though he would be there to see his old partner in photographic crime, but maybe he was away on some photo assignment. However, he does at Blackalls Park two years ago. Must get John to give a lecture on how to keep the road accident rate down. My spy tells me that the govt. has set a target and committed itself to 2% to journey forth to Fiji to see what can be picked up in that direction (kimono to grass-skirt).

Well, 2AXH will be home long before this appears in print and all his friends are anxious to hear all about his trip to the shaky Isles. My spy also tells me that Rodney 2CH is still in Fiji and will be returning in time for Christmas. Congrats to John 2JU on his appointment as our L.T.U. Rep., so now you laggards your last excuse has disappeared, or has it. Don't be a Yid—give a quid (quotation by kind permission of Pop 2AHU).

Well chaps, your next meeting at the University is on Friday, Feb. 12, at 8 p.m. Make a point to attend. The program is an excellent programme has been mapped out for this year with quite a few southern importations. See you all also at the social gathering at 2XT, Bill's haven, on the 25th.

### BULE MOUNTAINS SECTION

The Dec. meeting was held on 18th at Springwood R.S.L. Hall and was a rather special meeting as the festive season drew near. President as 2MZ, 2QA, 2ASB, 2AVK, 2RM, 2WNC, 2ARF, 2ZDU, 2ZL, 2ADP, 2MHN, Boyd, Gossling, Snell and Russell. Business as held to a minimum and consisted mainly of discussing plans for moving the Section meeting place to new quarters in the Lawson Council Chambers. The Jan. meeting will be held on 2nd at the same place. 20 and 20x equipment operating that night followed by 5 and 2 mix equipment at an early date to tie in with W.L.C.E. Plans are afoot to hold morse classes and lectures for those intending holders of the A.O.C.P. in the Group.

Construction is well under way on 2 mix converters for those members who do not already possess one, by Wal 2EMZ and his willing assistants and samples were on display which were studied by all.

A very appetizing pre-Xmas spread was turned out by Syd 2AVK and Norm 2QA and the Section funds suffered a large blow at the local hotelery which provided adequate liquid refreshments. It was pleasant to note that at the wind-up of proceedings all 20's had been fully neutralized and no splatter was left for the mice.

Activities of the members have been a little hard to trace this month due to the festive season disrupting consistent QSOs. Bill 2HZ and several other members have been away on holidays and have not been heard from the bands. Wal 2MHL has been very active on 6 mHz during the Ross Hull Contest with a 3 el. beam and 322. He thumps a very solid signal

into this QTH on that band and is knocking ZLs over right and left. Don't need a mast on top of your mountain, eh Wal?

Syd 2AVK has been heard actively on this band and has been heard from the Hunter Valley, Indians a little on the extreme fringe areas. Yours truly is slowly getting started also and if this new 4 el. yagi works out like I hope, it will be heard interstate shortly.

Dave 2NK and Keith 2ADK have been busy getting gear at Lawson for the chopper project and that is possibly why I haven't heard them much this month. Don 2ART appears to have temporarily deserted c.w. on 40 now and is putting out some nice phone there. Norm 2QA has been heard on 2 mHz regularly and must be deciding that a rxal on 40 is hard yakka business.

Jack 2ADP is constructing a very nice rack with Geico and 807's at Penrith. On-air tests believed successful so after a long absence should be active soon. A new equipment also under way at his QTH. Heard Wal and John 2FTR discussing plans for a fishing trip northwards with Horrie 2ZL so wish them all the best. Should know by now of the recent meeting of the NSW Society. Skell, having acquired a new car, is busy building mobile 40 and 3 mHz rx's into it so should be a good starter for fox hunting soon.

Would like to advise all members that a visitation at the Feb. meeting will be to Blue Mountain's R.D. Mr. Oliver, Cnr. Street, to advise how we can assist in emergency communication, so I would ask all possible to attend this important meeting at Lawson on 30th Feb. 73 EASZ. —

### VICTORIA

During this time of the year when people are away on leave and there is no general meeting of the Society, it is difficult to please excuse the brevity of these notes.

I don't know whether I am suffering from imagination or not, but it seems to me that there is a lot more portable and mobile activity on the bands these days than there has been of recent years. Perhaps it is to be expected a personal interest in this type of operation in the future. Surprisingly enough a large proportion of the stations heard were using quite low power, mostly between 5 and 10 watts, and two or three even lower than this. Despite the QRP, the white noise and the like, signal strengths and quality were generally very good so it is hoped that the operators will be encouraged to enter the State Field Day which will be over at sometime later. There are in print, interestingly, at this stage, the Publications Committee intends to enter a station in the field day this year and it is hoped that present plans will bear fruit.

No doubt through improved interest in most of our minds at the moment is the plan of great concern with regard to occupation of the new building. As some of you will have heard via

the broadcasts and grape vine, the formalities of the purchase are now well and truly complete and the plans for our occupation of the building are well advanced. There is more to be done in the way of fitting out the rooms and the eye and it may be late February before any semblance of order will start to emerge from the dust of battle. The first of the jobs associated with the shift started in mid January and it is hoped to ready the Queen Street premises until everything is ready at the new address to avoid the inevitable pile ups that result from a hurried shift.

President Fred has the organisation of the shift well in hand and intends to give us a full report of progress at the February meeting. Members will also be given the opportunity for general discussion on the building project and members of the Building Committee will be on deck to answer questions. By the date of the meeting the arrangements for financing our building should be pretty well in order and members will be given details of the proposals.

Our President has been busy getting the new transmitters into shape for the new location and has run into a bit of bother with "talk back" from the modulation transformers. Apparently this is a common fault of the 2M815 and was built in to afford a rough type of monitoring under service conditions. The feature is not particularly suitable for our purposes so Fred has arranged for the transmitters to be modified and placed in such a way that they can be quietened down somewhat. Because of this and the necessity to build up ancillary equipment, the new transmitter may not be ready for a week or so and in the meantime it is necessary to keep up with work in the new building as a temporary measure to fill the gap. However, it is hoped to avoid this if possible to save the extra work. There will be no further Sunday morning broadcast until the new transmitter is installed, that will be carried on from members' homes until the Victoria Street address is in operation.

In addition to the above the agenda for the February meeting includes an address from Alan Swindon, ex-VKSAD, who will give us the inside story on his sojourn in Aden, including a look at his equipment. It is all told it promises to be a very interesting meeting.

Congratulations are offered to Bill Butement (VKSAD), a member of the Victorian Division W.I.A., who was shown in the recent hours list as being promoted from G.B.E. to C.B.E. He is chief scientist of the Dept. of Supply

### WESTERN ZONE

We had a nice gathering at our Annual Convention held in the Gardens at Hornsby on Dec. 16. It was a very informal gathering of the chaps. There were about 20 members present, together with XYLs and harmonics, also some members of the Radio Section of the local Rural Fire Brigades.

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After enjoying a picnic lunch, we held our meeting while the women folk made a tour of the grounds. Before the meeting, our esteemed members stood for one minute's silence in respect of our late member, Mr. Jim Farrer, VK3KD.

New office-bearers elected were: President, Herbie 3NN; Vice-Presidents, Gordon 3CW and Bert 3EP; Scribe is still Secretary & Treasurer.

#### NORTH EASTERN ZONE

Xmas Day and in VK3 land way out west, sunburnt country, hills and flowing plains, rugged mountain ranges and no radio (ham) within miles. Bruce SAGG on holiday with XYL and baby, having with very strict rules from XYL about ham gear, all to be exact. Never mind Bruce, I had a similar set of instructions and I am sorry I did not obey them. Wonderful location here for DXing at least the official band emigrates to VK3. The same wishes you all the best. Let and we do hope to QSO occasionally.

SKR's XYL in car accident recently. We hope that XYL and car did not suffer very much damage and that both have been repaired. Would like to welcome to the zone, Peter and Elizabeth and 3ZGR ex-Bentley. SABX is in new QTH at Mt. Beauty, while SAUW of Simoko has a 20 m rx unmodulated. Hope you dod the bog Arthur and get amongst the DX. Looking through the R.D. Contest results I see a disappointing number of logs from this zone, three or four. Not exactly a good representation. Let's do better next time fellows. Only thing from Wang, 3VY and JMK, is that these boys are selling quite a bit of gear. I wonder if this doesn't mean we are following QRT?

3CI getting a fair share of Interstate DX on 6 mc during recent openings. Sid welcomes any contacts on 2 and 6 mc; Z calls take note. GL, late of our zone, will be home early in the new year after a sojourn at Mawson. Doug, will have quite a lot to tell for those interested.

Jim Harrington now ready for the Bushfire Net at Euroa. Count us in. Am hoping to be confined with the Ham net of which I haven't heard a thing, what goes on Henry SHP? A line or two from you would help a little. The Xmas spirit has caught up and I am afraid I am going to write coherently, so see you in the new year.

#### MOORABBIN AND DISTRICT RADIO CLUB

The annual general meeting last November resulted in the following being elected to the committee: Jack Hudson (President), Bob Bell (Vice-President), Laurie Walters (Secretary), Peter Downie (Treasurer), Ian Caporn (Assistant), Ed Mansfield, Arthur Oakes and Ron Hildebrand (Committee members).

It was decided not to hold a picnic this year and it was hoped that members would participate in the National Field Day instead.

We have received the very good news that the Moorabbin Council hope to make a meeting room available to us again at the Council Chambers in the near future.

Visits to the Melbourne Observatory is planned shortly and members will be notified in due course.

Our first honorary membership certificate to go to a New Zealand station was awarded to ZL3LJ. The rules for the award of the honorary membership certificate have been amended and brought up to date. It is hoped that the new rules will be published in "A.R." shortly.

Our last meeting for the year took the form of a Xmas Get-together at the shack of Ed. Mansfield in McKinnon. Many a glass of amber and other coloured liquids was consumed and a tall story swapped! Once again our hearts thank Ed for masking his shack available.

The club extends wishes to all readers for a happy and prosperous new year, with loads of DX!

#### QUEENSLAND

##### TOWNSVILLE

The wind-up of the year's activities by the local club was a get-together at the rose garden local corner shop, where many 80's were broken. A good time was had by all with the exception of a few who stayed at home to work DX on 10 m while the top notchers for this band were busily swapping tall yarns about countries that got away.

I wonder has anyone got down to analyzing the results to the I.T.U. Appeal. I for one took out the following figures. Transmitters alone, 30 call signs, 11 contributed Queensland, approx. 300 call signs listed. 112 did the right thing. No excuse as all call signs had received card through the post. Was amazed to find some old timers who were very active fell by the wayside. This includes all contributions up to "A.R." Jan. '59.

A recent visitor to Townsville from Woombah was Jim Frost on holidays. While here, he organised a moon-watch group and invited all amateur radio clubs to join. Quite a large roll up and resulted in Jim, Treasurer of a local amateur group as Chairman, Allan 4PB as Secretary, and Bob 4CR as Communications Officer. All other Amateurs to help out as required. Nothing being heard on 30 mc at time of writing on the Russian moon rocks.

Rex 4LR who passed his final exams to the University, has disposed of most of his gear. The boys wish you all the luck in your studies. Rex Allan 4BE holidaying in Sydney and promises to do the shops and disposal yards over and bring back much gear. Hope the necessary db's. hold out. Vern 4LK called

in during his visit to Tivoli today after calling on the local Z call signs. Quite thrilled to have at last established a link on 50 Mc between Townsville and Charters Towers. The holidaying at Magnetic Island was not allowed to take any rig over there. Len 4GD and Eric 4EL ganging up on the DX on 28 Mc. Jack 4DL banded up on 14 Mc. What a surprise. Some of the lads were the audacity of a pirate in using their call signs. It will be made walk the plank if caught. Basam 4ZW buying amongst the far northern boys in arranging a trophy to perpetuate the memory of Andy 4BW.

In our last meeting when the local radio inspector called on us, he said for amateur transmission, noise level was at 8 dB above on all bands, it being 3 plus which ever band he tuned. Have been promised a visit very shortly with the van in an attempt to locate my bug bear. More hoping it is found and cleared up, then far northern boys will hear me again on 7 Mc.

Ron 4RC, ex-4RG, unable to get permission to again visit VK6, went to the other extreme and went for the hen in Port Moresby, doing a good job there helping out on the Sunday morning with the hen. Must be a thrill to a rag-chewer one of these days. Doug 4RY also on holidays. While John 4FP also holidaying in N.Z. using a mobile call, ZL3AZU called in and established a four-way between Port Moresby, 4K4DZ and 4K4AR. John was quite pleased with mobile gear working so well on 31 Mc. Wally 4HU almost finished re-building and should be on the air era these notes appear. Anyone help with the circuit of a Kingsley Rier or KF/686 Converter for 80 Mc.? Please contact 4K4W.

#### SOUTH AUSTRALIA

The fellowship available resulting from W.I.A. meetings was clearly shown at our Christmas meeting, with record attendance of members came along to "talk-it-out" in a very pleasant atmosphere.

Many visitors were welcomed including Mr. Trainer and Merv. Brown who met many of the gang who before were perhaps but call signs to them.

The meeting opened with three excellent films arranged by Vic, Dennis and Lindsay. Jack Watts which were very well received. Subjects covered being the paper pulping and manufacture industry, the newspaper publishing business, a trip to the Antarctic with a scientific expedition and highlights of the effect of insect pest life on world food production. Some of the finest photography viewed for many a long day was seen in that last. The close-ups and magnification of the insects and their antics were spectacular to say the least.

The class was not run that night so all class members got along to meet the gang and hear how the old timers (and some not so old) talk. We were pleased to see them, too.

Joe 5JT was present, it was a pleasure to see him mixing with the young-uns, we don't often see him at the meetings but of course most of us know he does a lot of behind-the-scenes work in handling all the official communications.

Tom SAQ was down from Leigh Creek, a bit irksome in collar and tie, but for all that enjoying the party in the cold south. Harvey SHQ and Les 5LIC were also seen mixing around so you see they all came out of hiding for the occasion. Our On-going Committee will have to consider some time a large meeting room for the present quarters were taxed that night, and with ever growing membership, it will crop up before long.

Supper provision was by basket, Doc 5MD and his gang supervising distribution, whilst Jim 5FQ with attendant waiters dispensed coke by the gallon. Local waiter and tablecloth layer, Jim Paris, was as usual decked in his regular paper apron, but it was noticeable this year that the table cloth finished up with no outstanding circuits to add to the knowledge of passers-by.

Last year you might recall that Len 5AK disposed of his pre-amp. between a plate of buns and a bottle or two of coke.

The three marketeers, Athol 5LQ, Lions 5LB and Jack 5KQ were in evidence, but Athol a little worse than usual, for arriving without any cigarettes, put the nips into your scribble (not Penny this time) and smoked heavily of Gavins brand all night. Athol's 4G4 been slowly getting shape, it was at the pre-drawing board stage two years ago and has now reached the stage when the

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pencils are being sharpened. In the interim a rusty trusty dipole feeds the air from his way.

Many thanks to Warwick SPS for helping me out last month—at this stage do not know what he put in the notes—but on his return I will write him again and ask him to think the thoughts might have to be withdrawn.

VKS adds its congrats to F.C. for being able

to and selecting John JAU to represent us at I.T.U., it's hard to think of that conference without him. VKS also says "go well" and hope to have someone with John's background, both commercial and amateur, to push our barrows for us.

Had an interesting contact on 21 with Bob GNO—SME. He initially planned to add a station that has settled down well in N.G. and looks for VKS contacts. By the way, anyone heard of G3HIC on 21 c.w.? He is on the lookout but to date nothing heard of him here.

A few months have elapsed since a batch of membership certificates not coming to hand. If you haven't received yours, then enquire from Secretary John SJJC and he will bring the matter right. A change over in Secretaries will bring a change of address.

Burnie SWC advises the new shack in the old place or the old shack in the new place,

most likely the latter, and that operation there in it to be resumed very soon. A busy bee writing up the new antenna, etc., etc., at the hottest time of the year, the cause of the slow down.

Growing interest in a.s.b. evident in VKS, a couple of newcomers in Alan Smith and George SGD have been bowing them to this method. The Magazine Committee have a proposition before them of an excellent series of articles on a.s.b. that may appear soon, and shows just how it can be done without too much trouble.

Every now and then the post session callback produces a new call sign; recently Brian SEM announced his entry (Ardrossan) and using a Type 2 does a good job that way. Carl SSM similarly appears on one Sunday and then finally Joe JWF although not a newcomer to the bands, fed 40 mix into a 30 maz folded dipole and made a real hole in the ether. Slumming it a bit isn't Joe to the bone on 10.

Joe JWF on the bands again, very good to hear you Joe, don't overdo it, but bob up now and again, we like your brand of humour, of course, the QSOs we had with you were A1. SLQ and John and Len MAF. Who wouldn't get a bit mixed up with a mouthful like that?

And then that character Frank SMZ, who, en route for VKS dropped in at some unearthly hour and awakened Jack at Murray Bridge. Some 200 miles away at 10.30 a.m. It was, anyway, by 10.31 a.m. Jack had the rig on the air to show Frank how it sounds away from the city. How is the physical culture, Frank?

Green SWK now has a rig of his own, well nearly. The final was donated by Panay SPS (hurrah that puts him off the air—me, not Ed.), sorry it should read SWC, whilst Panay donated the modulator. Gordon supplied the power supply. The idea is that the final, a resonant one too if you please, which has now joined the box where all resonant chokes finish up. Anyway, this charity rig uses 40V, 5Amp 80W, 6V 6W 50W another, but where they came from think no class at all. Poor Panay now on c.w. 10! That bunion will make it hard.—Ed.)

An excellent signal from Len SGD recently with his new 100W 100% modulation equipment. He has promised an article on it soon, must be easy to get going from all accounts, for it contains three low-level tubes only and on his test Rig did not need screen protection. The idea is a system of two, so you who have used this fiery tube know how it needs holding down in ordinary circuitry.

Have just received Jan. "A.R." and what a Pal Fandy has turned out to be. Said I might have to withdraw thanks! Withdrawal is right, but I have many more to say, and

likely sideband filters or decrelief c.w. keys, and a bucket full of libel cases coming up. For a long time now have been trying and I think I have found the answer. I have the printed word from my scribbles the little extras that some bloke called EMI in brackets pokes in, and now in one splash Fandy undoes all my efforts. Why you model for Berlitz! Well till next AR, I'll say, I'll see you, I'll suggest sidebands, that will trick him.

Council doesn't have to wear sack cloth now anyway, that deal was with the gods, and when we have the only ones who know it needs to use the stuff. Never going near a racecourse now has improved the prosperity no end. Mr. Pincott, Sir, have nothing to do with you know who, hope Doc feeds him sometimes.

## WESTERN AUSTRALIA

The Christmas meeting was held in the annex on the third Tuesday in December. A very large attendance was noted, including quite a few from outside the state. Much chewing of the rag was indulged in by those present. The occasion was unique in that two of our three life members were present—Wally SAG and Skipper SWL. Skipper, who gave up operating because of business, is hoping to become active again. He is 66 years of age. SAG is working on plans for a xtal controlled 40 and 30 maz rig. During the evening, Wally SAG showed slides of wild flowers and wall flowers. Both were highly appreciated.

Activity on 40 and 49 maz is very low at present, not an unusual state of affairs during the summer time. Sunday morning usually sees quite a bit of 40 maz activity. From the reports of the writer, who did the review for two Sundays, the session appears to be very popular, reports coming from quite a number of stations. The last Sunday in December saw the News Service broadcast to the United States as six mix was wide open at the time.

During December, Alex SAD and Wally SAG had the opportunity of meeting at the boat GMIGN (Neil Campbell's white motorboat). Australia was visited by this Division. Alex entertained Neil and family for the day, taking them back to the boat at night to continue their journey to VK3. News has since been received that Neil lost his son in a road accident soon after leaving the boat. Many hours. We are very sorry to hear this and pass our sincere sympathy on to Neil and his family.

Christmas day saw a great deal of activity on 40 maz, when, apparently, most VK5 stations who can operate the band, took the opportunity of wishing the compliments of the season to fellow Amateurs. I did not log the number of stations active, but the band was reminiscent of the days of my youth.

The six boys continue to have a good time on 50 Mc. Several very good openings have eventuated into VK3. 3, 4, 5, 7 and ZL. Most of the boys have worked in these openings. It continues to be the most active band in VK3, and the activity continues. About 22 of these are limited licenses.

I have heard from Allan GMA, who is now resident in Childers. Unfortunately Allan has no power and transmitters cannot be run on battery. So Amateur operating is impossible at present.

That's the lot for now fellers, so I will close, belatedly wishing you a happy and prosperous year in 1958.

## TASMANIA

### NORTHERN ZONE

The last meeting for 1958 was held at the home of our President Geoff on Friday, 13th Dec. This was our Xmas Party and meeting combined and about nine members turned up to make it a very good meeting. A vote of thanks to Geoff and the social committee was passed to Mrs. Crompton.

Good wishes were also handed to Henry who sits for his A.O.C.P. this month and by the time this is in print will have had another V.W.E. in our credit. All the best Henry. I must let you into my new year resolution to get my ticket this year (I hope). So what about the other associates having a go too? (Commemorative QSL card).

The January meeting is to be held at George Town where we are to be the guests of George TGC and I will report on that evening next month.

I have been having a very lazy time enjoying the holiday at Ulverstone, so if news seems a bit scarce I'm afraid that we will have to blame the holiday "atmosphere". Last night I visited my North Western Zone counterpart, Terry, and found he was very well with a sheet of aluminum semi pole and TUBB fitting units scattered all over the place, so I don't think it will be too long before Terry is calling CQ.

Tonight I am travelling to Burnie where I hope to visit some of the chaps and meet them for the first time.

Well chaps, I guess that will be all for this month so cheerio for now and all the best in '59 for our hobby, Amateur Radio.

### NORTH WESTERN ZONE

Well chaps here we are well on the way into the new year; traps all have survived the Xmas period, and are once more safely back at the granddads.

Our last zone meeting was held in December but the attendance was down on the usual run. Let's make a new year resolution chaps "to attend all meetings if at all possible". We have a large number of associate members and

it's up to licensed members to do their utmost to keep them both interested and keen with a view to getting them gassing their license.

At the meeting (the last for the old year) it was decided to hold a tx hunt on 14th Dec. The idea is to be in and set up the first a short run to enable all participants to turn up at the hiding place more or less together and in reasonable time for dinner. During dinner the tx is to be re-hidden in preparation for the hunt in December.

It was decided not to hold the instruction night in January owing to so many members being away from their usual QTH. Next meeting being a general meeting (on Feb. 3) with purchase of tickets for the Melbourne Show. There was a good article on radio direction finding in the Jan. issue "A.R." so perhaps we will see some improved gear at future hunts.

Visitors, and here eventually, members, in Geelong and Winton, were welcomed.

A much appreciated supper was served by XYLs and Max JMX official as auctioneer, there not being quite the usual quantity of "junk" to be disposed of.

The tx hunt was duly held on Dec. 14. Less TX, better the fox and his signature av. 4W which nevertheless put quite a healthy signal on the air. Yours truly was lucky enough to be first to locate hiding place while a couple of others (the names had to be talked in through the speaker) of around 100m. got to his home QTH. For the second run, Tim got to the finishing line first hotly pressed by all other entrants in a string. Really a lovely spot on the eastern bank of the Forth River, Port Phillip.

Lee JKC is in the throes of re-building and is having some fun with a v.f.o. which develops grave instability on the 40 maz band; humorous I don't think.

More news from associate David Waldron last night who brought along his brother Ray (Northern Zone scribe). David's morale is showing great promise. Hope to see some of the doings of the Northern Zone in print soon, I hope.

Adjust your social calendar chaps and keep those first Tuesdays in each month free. Do your best to attend all meetings, please.

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**FOR SALE:** Complete professionally designed 150 watt phone/c.w. transmitter (p.p. TZ40s), 40 to 10 metres. Wilcox-Gay VFO. 120 watt modulator complete. H.T. supply 1250 volts 350 mA. (all Weden components). Fully metered, relay controlled, in black crackle steel cabinet 19" x 36" x 18". H.R.O. Senior Receiver with p.p. and b.c. coils. £100 the lot, or will separate. New GB Hy-lite 35 mm. projector, £25. A. Swindon. 87 Brighton Road, Elwood, S.2, Vic. (X.A. 1432).

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**SELL:** 10 maz Converter, power supply, r.f. stage, £6. E. Blackmore, Dunderas Rd., Maryborough, Victoria.

**WANTED:** Type "A" Mark III. Transceiver. State condition and price to M. J. O'Brien, C/o. P.O. San Remo, Vic.

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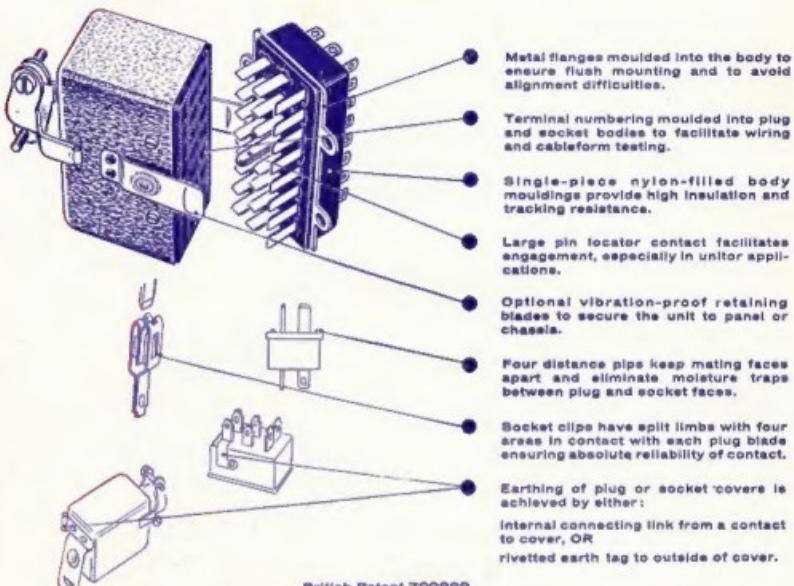
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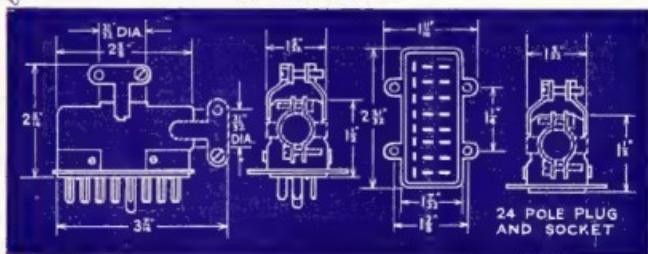
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